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# i+d



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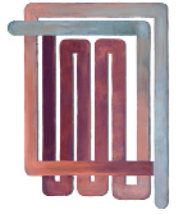
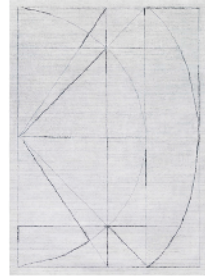
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*The Designer’s Mind*

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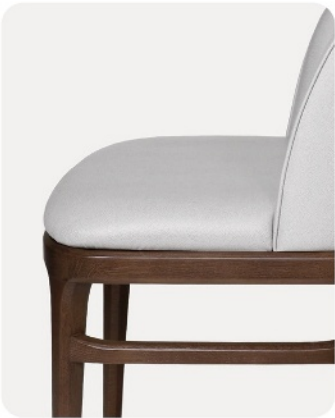


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# September/October 2018

**VOLUME 2/NUMBER 5**  
The magazine of the  
American Society of  
Interior Designers and  
the Interior Designers  
of Canada

## 22

### DESIGN GIVES BACK

Transforming lives—and the design industry—is the mission of these three diverse organizations. Equally inspiring is their mission to stimulate and encourage the next generation of designers.

**BY ROBERT NIEMINEN**



Image: Dolphin POD

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### MAKING USE OF EVERY MOLECULE

The green chemistry movement takes chemicals, materials, and fuels well beyond the test lab to the products used in interiors of all kinds.

**BY EMILEIGH CLARE AND TODD SIMS**



Image: Sherwin-Williams



Image: Alan Barry

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### DESIGNING FOR THE UNSEEN

As cutting-edge companies and organizations recognize the fiscal and productivity benefits of integrating wellness within the workplace, the design community looks to science for nature-oriented product and process solutions.

**BY BRIAN J. BARTH**



Image: DesignTex

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### COLOR, IN THEORY

Gurus of hue help explain the ways the psychology and public perception of color influence everything from what we buy to our energy and happiness quotients to our ability to heal.

**BY DIANA MOSHER**



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## September/October 2018

**COVER IMAGE:**  
Brendi Wedinger

# 56

### ICONIC PROFILE: JASON F. MCLENNAN

A leader in the green construction movement offers his philosophy on his life's work: architecture and design that heal the planet and leave the world a better place.

BY AMBROSE CLANCY



Image: Danilo Agutoli



Image: Humanscale

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### INSPIRING WORK AT HOME

The goal of any home office? Finding a balance between the comforts of a residence and the functional requirements of the workplace.

BY MICHELE KEITH

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### ON THE COVER

The trinity of science, nature, and design are at the core of human creativity, influencing our thoughts, actions, and wellbeing at every turn.



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Randy Fiser, CEO, ASID,  
and Tony Benders, CEO, IDC.  
(Image: Lindsay Cephas)

# RESEARCH-DRIVEN DESIGN

As humans encountering the world, there is science to all we experience and all we pursue. From the air we breathe to the products we purchase to the spaces we design and enjoy, in ways both subtle and obvious, we exist in a constant state of interaction with the scientific world.

In deciding to dedicate an issue to the science behind design, we wanted to explore the many principles of science that directly affect the design industry—biology, psychology, and chemistry chief among them. Upon researching these areas, plus additional scientific fields and their design connections, we realized we could have filled volumes. In this issue, we explore the concepts of biology in the built environment (“Designing for the Unseen,” p. 34), the psychological effects of color (“Color, in Theory,” p. 50), and chemistry’s influence on our material world (“Making Use of Every Molecule,” p. 40). We also dig into topics that aren’t always tackled in conversations about design but that are critical to the complete design process, including empathy, neuroscience, regeneration, and custodial work.

Our conclusion now that this issue is complete? The worlds of science and design are inextricably linked and complement each other at every turn. As we continue to experiment on both sides of this relationship, our understanding of how the two fields can help one another to grow will only deepen and the resultant work will enhance the human spirit and positively impact the spaces where we live, work, and play. ●

Randy W. Fiser  
ASID CEO



Tony Benders  
IDC CEO







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# REGENERATIVE RETURNS

ONE OF THE MANY PROGRAMS THAT FALL UNDER THE INTERNATIONAL LIVING FUTURE INSTITUTE, the Living Product Challenge incites manufacturers to develop products that are healthy and inspirational, improve end-users' quality of life, and give back to the environment as well. It's no small dare and is fast becoming a driving force in the design industry's awakening to the effect of building products on the planet and the people who inhabit it.

The challenge examines 20 overall imperatives, organized into seven performance areas (Petals), to determine whether a product will become "Petal Certified." The Living Product Challenge considers place, water, energy, health and happiness, materials, equity, and beauty when determining if a product will earn certification. The philosophy behind the challenge is that products should give more than they take. It encourages the creation of products and practices that are healthy and free of toxins, socially responsible and respectful of the rights of workers, and net positive and beneficial to both people and the environment. Shown here are just a few examples of products that have risen to the challenge.

For insight from International Living Future Institute Creator and Board Chair Jason F. McLennan, see "ICONic Profile," page 56. ●

**1. SHANNON SPECIALTY FLOORS, TEKNOFLOR NATURESCAPES HPD.** Manufactured in Detmold, Germany, and with U.S. headquarters in Milwaukee, TEKNOFLOR Naturescapes HPD is an organic sheet good made with ecuran, an organically derived polyurethane composite material processed from plant-based oils and naturally occurring minerals. The product has a life expectancy of 12 years in commercial settings and 20 years in residential settings, and offers a take-back program as an option at the end of the product's life. Imperatives Achieved: 16. Petals Met: Place, Health & Happiness, Materials, Equity.

**2. INDUSTRIAL LOUVERS, INC., CUSTOM ALUMINUM SUNSHADES WITH FLUROPON PURE KYNAR FINISH.** Industrial Louvers' custom sunshade products help reduce energy consumption and increase occupant comfort, all while adding architectural interest to a building. Manufactured in Delano, Minnesota, the product has a life expectancy of 30 years and is fully recyclable. Imperatives Achieved: 19. Petals Met: Place, Water, Health & Happiness, Materials, Beauty, Equity.

**3. CROSSVILLE, INC., RETRO ACTIVE 2.0.** The Retro Active 2.0 tile line is suitable for any indoor application, as well as exterior covered walls. The product, which draws color inspiration from nature, has a life expectancy of 60 years and is salvageable and reusable in its entirety. With manufacturing facilities in Crossville, Tennessee, the company recycles more tile material annually than it produces. Imperatives Achieved: 14. Petals Met: Place, Water, Beauty.

**4. PLANT SOLUTIONS, MOSSWALLART.** Manufactured in Scottsdale, Arizona, using 100 percent real mosses, lichens, natural woods, and organic features, each hand-crafted MossWallArt creation is an exercise in biophilic design. The products act to absorb sound, have a life expectancy of 15-plus years, and are salvageable and reusable in their entirety. Imperatives Achieved: 14. Petals Met: Place, Water, Equity.



Image 1: Shannon Specialty Floors/Image 2: Industrial Louvers, Inc./  
Image 3: Crossville, Inc./Image 4: Plant Solutions

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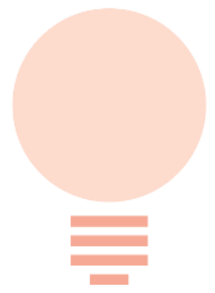
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IDS is situated among a thriving and diverse network of design schools, institutions, studios, showrooms, professionals and design-savvy consumers where the annual Toronto Design Week has expanded to over 100 venues.

Stay tuned to [idcanada.org](http://idcanada.org) for more information on tours, additional programming, and announcements.

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# Shaw Contract Introduces Inside Shapes, a creative toolkit for dynamic environments.

## DESIGN LANGUAGES MERGE TO INNOVATE

Shaw Contract, a design leader in commercial flooring solutions and surfaces, is excited to introduce its new carpet tile collection, **Inside Shapes**. The result of shared expertise and imagination led Stockholm-based design studio, Form Us With Love and Shaw Contract to challenge how the standard 24" x 24" carpet tile might be approached in a new and unique way.

"Shaw Contract's work ethic didn't feel all that different from how things work at Form Us With Love", said Form Us With Love co-founder John Löfgren. "We had an intense level of dialogue, iterated endlessly and went to the farthest reaches of our imaginations to then concentrate our mutual findings and push the process forward."

The geometric shapes are cut using CNC technology, and the simple reframing of the tile as an object, not a surface, created new possibilities for an innovative toolkit that allows designers the freedom to design, and not just specify.



"The shapes themselves become characters in an overall narrative that allows each designer to tell a singular story"

—Oriana Reich, Shaw Contract

"The shapes themselves become characters in an overall narrative that allows each designer to tell a singular story", explains Oriana Reich, Brand Director at Shaw Contract.

With four distinct geometric shapes – square, diagonal, point and curve – and 12 colour options, each in light and dark shades for added dimension, **Inside Shapes** provides myriad choices for designers to bring the floor to life through wayfinding and spatial delineation to illustrate areas of focus, collaboration or play. Shapes, colours and shades can be chosen in 17 pre-mixed options or curated individually for a completely custom solution.

"This is not just a new collection – it's actually an entirely new system that in part derives from the product design language that Form Us With Love is known for. At the same time, it's an entirely new way of thinking about floor design."

For more information, visit [insideshapes.com](http://insideshapes.com)

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INSIDE SHAPES

# DESIGN GIVES BACK

BY ROBERT NIEMINEN

## Three charitable organizations leverage the power of design to make a difference in our communities

DESIGN IS A UNIVERSAL LANGUAGE. IT TRANSCENDS AGE, SEX, RACE, AND CULTURE AND TOUCHES HUMANITY BY IMPROVING ITS CONDITION IN TANGIBLE WAYS. But, for design to have efficacy, designers must possess and exercise empathy—the capacity to identify with the end-users of the objects and spaces they create.

The power of design to transform lives is displayed most clearly when it is leveraged to impact communities and the people who inhabit them. Thankfully, one doesn't need to look far within the design field to find examples of this generous and compassionate spirit at work. Indeed, it's part of what makes this industry such a special one.



LEFT AND FAR LEFT: “Tribal Instincts,” designed by HVL Interiors, touches on human nature and ethnicity, and features natural elements. The design highlights how we are at our best when in sync with the rhythm of nature. (Images: Kohler Co.)

*“[Designers] have a profound understanding of the impact that good design has on our psyche and wellbeing.”*

—STEFFANY HOLLINGSWORTH, HVL INTERIORS

As such, *i+D* recently spoke with several organizations that are paying it forward, so to speak, by utilizing their talents and resources for the benefit of the common good. Although different in their respective missions, what they share in common is a desire to have a positive impact on the world—one that will hopefully inspire the next generation to follow suit.

### ASID Foundation: Advancing the Industry

It should come as no surprise that an organization like the American Society of Interior Designers (ASID) believes that design can transform lives. ASID has a long-standing reputation in the industry of showcasing the impact of design on the human experience and the value interior designers provide.

To that end, the organization created the ASID Foundation in 1975 to advance the interior design profession by drawing upon its resources to promote meaningful collaboration and research, award scholarships, and fund projects that broaden the value of interior design. To assist in its efforts, the foundation was recently the recipient of a generous donation made possible through a design partnership between Kohler Co., Cosentino, and Benjamin Moore & Co. as part of a special joint marketing effort in which a number of design firms were asked to design a kitchen featuring the trio of suppliers' products. HVL Interiors' contribution, titled “Tribal Instincts,” which touched



Wayne Thomson

At the 2018 DINING BY DESIGN gala in New York, Gensler, Knoll, and EvensonBest honored the New Yorkers currently living with HIV/AIDS with a canopy of 1,000 colorful origami cranes. (Image: Marion Curtis Starpix)

on human nature, ethnicity, and natural elements, resonated with Kohler—so much that it was chosen as Kohler’s Idea of the Year for 2017 and installed in the Kohler Design Showroom in Kohler, Wisconsin. In appreciation of HVL’s involvement in its showroom, Kohler extended a donation to the nonprofit of HVL’s choice.

“As long-time members of ASID, having benefited from membership on many levels, and in support of the mission of ASID and the ASID Foundation, we decided [the foundation] would be the best recipient of a donation that came to us through interior design...paying forward for the impact we know our profession has on wellbeing through ASID,” says Steffany Hollingsworth, principal partner at HVL Interiors in Santa Fe, New Mexico.

Hollingsworth notes how ASID Foundation’s mission to build a stronger, highly educated, and socially conscious design community reflects the heart of what HVL supports as a practice and in its volunteer efforts, adding the foundation relies on donations. “We wanted to put our money where our lifeblood is. This project provided the perfect vehicle to do just that,” she explains.

In broader terms, Hollingsworth observes that designers “have a profound understanding of the impact good design has on our psyche and wellbeing.” She further notes there are many future designers who hope to make a difference through design as well. Those possibilities to make a difference, she says, can increase through the applied research the ASID Foundation helps fund.

#### IDC Foundation: Funding Educational Pursuits

In the spirit of advancing the profession and helping the next generation of young professionals in their careers, the Interior Designers of Canada (IDC) created the IDC Foundation in 1990 as a registered independent charitable organization that provides scholarships, awards, and bursaries in interior design education and establishes grants for interior design research. One such endowment was created in 2016 by IDC and John Donat in memory of Wayne Thomson, a prominent interior designer in Ontario, Canada. Upon Thomson’s death in October 2015, his partner of 35 years, Donat, graciously donated \$10,000 to start the bursary fund and solicited donations from family, friends, and IDC members. Today, the Wayne Thomson Bursary is awarded annually to one or more design candidates to assist with the cost of their NCIDQ exam, which helps emerging professionals reach their goal of becoming registered interior designers.



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“Wayne, he was really into mentoring,” Donat recalls. “When I heard about the bursary, the IDC Foundation, and what it was for, that was Wayne. That’s what he did during most of his design life: mentor young people.”

Donat describes Thomson as a very quiet person who never raised his voice or shouted at people—a characteristic he leveraged to help entry-level designers in the workplace. For example, whenever a young designer made a mistake, Donat says senior designers often would get upset and shout at them. “Wayne would hear it, and he would go over and find the junior designer—and, he didn’t tell them they were wrong; he would just say it wouldn’t work this way, but if they do it another way, it will work,” he remembers.

To honor his partner’s legacy of mentoring, Donat wanted to ensure that young design professionals could receive assistance in their professional development, which is how Thomson would have wanted it. “The average person that goes to university, they end their four years and they graduate, they have loans they have to pay; and, with young designers, they’re going into work for a company and they have to rent an apartment and have to pay their debt,” Donat says. “So, the bursary helps them a lot.”

Donations are still accepted to the Wayne Thomson Bursary and can be made via the IDC Foundation page on the IDC website.



From grassroots to national foundation: DIFFA raises awareness and grants funds to organizations that provide treatment, direct care services, and more for individuals impacted by HIV/AIDS. (Image: Erik Bardin Photography)



Alessandra Branca teamed with Benjamin Moore to create a luscious garden setting for the 2018 DINING BY DESIGN gala in New York. (Image: Alan Barry)



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**DIFFA: Raising Awareness and Dollars**

In terms of exercising empathy, few other organizations within the design community (or elsewhere) express it as unequivocally as DIFFA: Design Industries Foundation Fighting AIDS. Since 1984, DIFFA has emerged from a grassroots organization into a national foundation to raise awareness and grant funds to organizations that provide treatment, direct care services, preventive education programs, and advocacy for individuals impacted by HIV/AIDS.

To date, DIFFA’s chapters and partners have tirelessly worked together to raise more than \$43 million to benefit hundreds of HIV/AIDS organizations nationwide. Mobilizing the vast resources of the design industries, DIFFA has supported a broad spectrum of programs, from HIV/AIDS care and treatment to education and prevention, funding such early initiatives as condom distribution and needle exchange programs, as well as taking an active role in supporting programs aimed at protecting the legal rights and security of people living with HIV/AIDS.





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## Business of Design Design Foundations

“Without the design community, DIFFA wouldn’t exist,” says Dawn Roberson, executive director of DIFFA. “The organization came about as a group of designers’ response to the AIDS epidemic and the crisis in the ’80s. Since that time, we have been mobilizing the talents and resources of the whole design community to help us with our events.”

Among the events for which DIFFA is best known is DINING BY DESIGN (DBD), the design industry’s most illustrious fundraiser to fight HIV/AIDS. The annual event gathers local and international brands and designers to create a showcase of extraordinary dining vignettes and to raise awareness for a worthy cause. DBD raises nearly \$1 million annually and hosts thousands of designers, notable guests, and avid supporters.

To help ensure its mission and message continue long into the future, DINING BY DESIGN also includes a Student Initiative comprised of student teams from three design schools in the New York City area that produce an installation as part of the event. Each year, the Angelo Donghia Foundation generously donates a \$2,500 budget to each student team to showcase their creativity and participate in a real-life design project, as well as to enable them to take part in a philanthropic effort in the process.

“Overall, it’s really such a great experience for the students,” Roberson explains. “It gets them involved with the cause, it gets them involved with philanthropy, and it gets them to a place where they have real-life experience—from concept to execution—with an installation and are able to see their vision come to life and have it viewed by 40,000 people in the design community. I think it serves a lot of purposes.”

For DIFFA, Roberson says it’s important for people to understand that the fight against HIV/AIDS isn’t over. With more than 1.1 million people in the United States living with HIV (and 13 percent are unaware of their status), much work is still to be done. “As members of the design community, we’re trying to do what we can to hopefully see an end to this disease and see an AIDS-free generation in our lifetime,” she notes. “We’re hoping with all the money we’re raising, with all of the things we’re doing with all of the education, that we can possibly be that difference—and that’s why we all like to say at DIFFA, we want to make a ‘DIFFA-rence.’”

At the end of the day, that’s what these three organizations and so many others are ultimately about: giving back in an effort to change lives for the better and making the world a more beautiful place in the process. ●



Inspired by the Surrealists, Design Within Reach partnered with Matthew Goodrich and Kendall Lowe to create a dreamlike installation at the 2018 DINING BY DESIGN gala in New York. (Image: Alan Barry)

**ROBERT NIEMINEN**  
is a freelance writer and regular contributor to The Architect’s Newspaper, retrofit, and Retail Environments magazine, as well as the editor-at-large of interiors+sources. He also was a contributing author to the book, *The State of the Interior Design Profession* (Fairchild, 2010), which was placed on the International Federation of Interior Architects/Designers’ “50 Must Read, Must Have” list.



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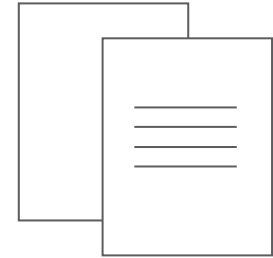
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# THE FLEXIBLE WORKPLACE



In an ongoing effort to better understand the demands of today's workers and the office environments that will best suit their wellbeing and productivity, Capital One conducted the 2018 Workplace Environment Survey\*, revealing the factors that make today's office spaces function best for all.

The survey asked 3,500 full-time professionals, age 18 and older, "to share thoughts on the impact of workplace design and employee experience on their satisfaction, creativity, and productivity at work," according to the survey summary.

Key insights that emerged from the research include:

- Deliberate design remains crucial to attraction and retention,
- Office design drives productivity and innovation, and,
- Employees want flexible workplaces and employers.

The survey draws the conclusions that "the revolution in workplace design seen in the past decade isn't just a trend," as significant majorities of office employees credit more design-forward workplaces with helping them to be not only more creative and innovative, but to increasing their productivity as well. In fact, 85 percent of those surveyed believe flexible workplace design to be important and nearly four in five employees (79 percent) agree companies cannot encourage innovation unless their workplace environment is innovative; that number rises to 87 percent among executive-level employees. Further, 83 percent of professionals and 87 percent of millennials agree flexible workplace design leads to better ideas.

The results emphasize the difference factors like remote work options, flexible spaces, and health and wellness initiatives can make in fostering a happy, healthy workforce. ●

\*The 2018 Capital One Workplace Environment Survey responses are comprised of 1,000 nationwide plus 2,500 combined designated markets (500 per market). In 2017, the survey was limited to only the five designated markets—San Francisco, Dallas, Chicago, Washington D.C., and New York City.

## What Employees Expect

58% Flexible hours

51% Ability to work remotely

47% Access to the latest devices and technology

31% Alternative desks, such as standing desks

30% On-site fitness centers

27% Online chat system for employee communication

Source: 2018 Capital One Workplace Environment Survey

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# Contributors

Believe that interior design and science are mutually exclusive? Think again—based upon the content in this issue of *i+D*, as well as from the authors whose articles and personal insights reveal just how much these seemingly opposite disciplines have in common.

**1. Emileigh Clare, *Making Use of Every Molecule***

In her role at the American Chemistry Council, Emileigh knows firsthand that “public understanding of science is such a collaborative effort. And, in this effort, designers can play a really important role in using evidence-based design practices. Scientists and designers can work together on the engineering and end-use of a number of advanced materials that incorporate a variety of properties from mold resistance to biomimicry.” When she co-authored the article on chemistry and interior design (p. 40), Emileigh corroborated how science can solve some of the world’s biggest problems. “If a molecule can be made more sustainable, it is a game changer on a variety of levels, not just in interior design,” she notes.

**2. Todd Sims, *Making Use of Every Molecule***

The co-author of the article on chemistry and interior design (p. 40), Todd’s position at the American Chemistry Council supports safe, sustainable, and resilient buildings and building materials. As such, he says, “innovation in materials is a critical element to allowing buildings to achieve multiple beneficial outcomes. Instead of creating an either/or situation, buildings can now be healthy, efficient, and sustainable all at once. One inspiring example I saw recently of how science and design intersect was at NeoCon: There was a great display on photosensitive flooring; another exciting new material is translucent wood. Both of these are chemistry...Chemistry has made incredible building products possible for a long time. It is a naturally curious field, constantly innovating—including both products and processes.”

**3. Ambrose Clancy, *ICONic Profile: Jason F. McLennan***

Ambrose always has interesting takeaways when he interviews industry leaders for his “ICONic Profile” series, including his recent conversation with Jason F. McLennan (p. 56). “When I asked [Jason] what strategy people can use to fight

against the rollback of environmental regulations in the United States, [he] said that, at some point, the only way to fight is to build better, greener buildings at a reasonable cost and developers will follow. ‘Making things better and cheaper is how commerce works.’ Simple, and right on,” recalls Ambrose. On a personal level, Ambrose is reaping the benefits of science in his workplace interiors “where the windows are durable, draft-free, nearly soundproof, and yet allow for abundant sunshine. Our new place also has a ‘smart’ HVAC system, although we’re still pretty stupid in figuring it out.”

**4. Michele Keith, *Inspiring Work at Home***

Prior to her assignment on home offices (p. 58), Michele says she had never thought about “the scientific aspects of the design of my home office, only its aesthetics and functionality. Talking with the experts, however, made me realize that such things as psychology and biology are an integral part of good design. I had incorporated them, but subconsciously.” What surprised her most is the extensive research being done by manufacturers—ergonomics, physiology, sound, light, every aspect imaginable. “If I were just starting out, I’d go into this field...amazing!” she states.

**5. Brian J. Barth, *Designing for the Unseen***

When Brian conducted interviews for his article on the science of healthy buildings (p. 34), he was astounded to learn how many PhDs are dedicated to building up the basic science that informs the design of healthy buildings. And, although Brian may not wear a doctoral gown and hood, he has developed an appreciation for meshing science into his own interior environment. He explains: “I work from a home office but, over the years, I’ve intuitively incorporated many aspects common to wellness design into my space, from a sit-stand desk and lots of lush greenery to getting the combination of natural light and shading just right to prevent eye-straining glare on my computer screen.”

**6. Diana Mosher, *Color, in Theory***

While learning more about the psychology of color (p. 50), Diana found it interesting that healthcare designers almost intuitively gravitate toward calm colors that create a relaxed setting. At the same time, however, she discovered, “you don’t want to make it so muted that ‘soothing’ crosses over to ‘depressing.’” In fact, Diana says she often sees design intersecting with science in this way in her personal life—even in such atypical interiors as the New York City subway. “At certain stations, the old fluorescent lights have been outfitted with LEDs that emit a brighter, happier quality of light that also creates for me a greater sense of wellbeing,” she observes. “Even though these spaces are frequently in the same state of disrepair...the brightness has a positive effect on my mood.”

**7. Robert Nieminen, *Design Gives Back***

While attending NeoCon in Chicago this past June, Robert was introduced to a technology used in fabrics that impacts health on a biological level: Celliant (See “Making Use of Every Molecule, p. 40). “Basically, Celliant’s 13 thermal-reactive minerals absorb body heat and are able to convert it to infrared energy. The energy is then recycled back into skin at the point of contact, helping to improve blood flow and circulation,” he says, adding he now owns several pairs of socks made with the new technology. “Not only do they feel good on, but they look as good as they perform.” Health also was top-of-mind when he researched the work of design foundations (p. 22), particularly DIFFA: Design Industries Foundation Fighting AIDS and the resources and awareness it provides “in hopes of realizing an AIDS-free generation in our lifetime.” ●

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# Designing for the

**Wellness, architecture, and interior design are increasingly intertwined as a growing number of specialists work to raise awareness of the science of healthy buildings**

Some aspects of the relationship between health and architecture are pretty intuitive, even if often ignored. In the mid-1800s, for example, British nurse Florence Nightingale revolutionized healthcare by demanding patients be exposed to fresh air and sunshine, rather than keeping them sealed off from nature in dungeon-like wards. Back then, it may have been little more than common sense at work. Today, however, we possess the technology and scientific expertise to target specific health conditions with specific design interventions. Those interventions still are not practiced as often as they are preached, but healthcare researchers are putting more and more such tools in the hands of designers.

“When Florence Nightingale was using daylight to heal patients with things like tuberculosis, scientists really didn’t understand the biological underpinnings of what was happening,” says Ashkaan Fahimipour, PhD, a computational biologist at the University of Oregon’s Biology and the Built Environment Center. “Now, we’re moving beyond basic questions about what microorganisms are found in buildings to more complex problems about how those microbes behave in different types of indoor environments.”

For the last several years, the BioBE Center, as it’s called, has employed squadrons of graduate students to crawl about campus collecting microbial swabs from desks, chairs, floors, bathroom sinks, and other surfaces. Researchers there are compiling and synthesizing the data as part of a long-term effort to understand the interplay between building design and what the center’s scientists refer to as the indoor microbiome. The health implications extend far beyond obvious concerns like preventing colds and flus, explains Fahimipour. “We are looking at things like the ‘education’ of the immune system early in life, which refers to how microbe exposure in infants and children impacts things like allergies later in life.” Antibiotic-resistant pathogens are another area of intense interest, he notes. “One of our goals is to understand how the ways in which we operate buildings like hospitals impact the probability of coming into contact with one of these pathogens. Bacteria do a lot of strange things, like eating up genes from the environment and incorporating them into their own genome. So, we have to look at not only which microorganisms are present in buildings, but what genes are floating around and how those might impact clinical usages of antibiotic drugs.”



# Unseen

The WELL Building Standard points to proper lighting and air circulation, as well as an exposure to nature, as among the concepts that contribute to a healthy indoor environment.  
(Image: Naomi Castillo)

The BioBE Center is focused not just on building the scientific foundation for better building design, but in translating that into tools and techniques that designers can pick up and run with.

Kevin Van Den Wymelenberg, PhD, co-director at the BioBE Center (and director of the closely affiliated Institute for Health in the Built Environment, also at the University of Oregon), is an architect who is comfortable spouting off medical terminology. He describes his work as “architectural probiotics,” or simply “designing the unseen.” The “unseen” he’s referring to is “not just microbes, but acoustics and thermal performance and all the nonvisual aspects of our physical environment—things like the retinal ganglion photoreceptors that send signals through our suprachiasmatic nucleus, which help us digest food and maintain healthy sleep and wake cycles.”

Van Den Wymelenberg envisions a future in which buildings modulate their own microbiome for the benefit of occupants. This notion is borne of the recognition that total sterility is an impossibility; rather than resorting to chemicals to eliminate pathogens, the focus instead is on encouraging a microbiome that is healthy for occupants. Realizing Van Den Wymelenberg’s vision will require breakthroughs ranging from a better understanding of the interaction between daylighting, HVAC, and surface design—different materials foster different microbial communities, which, in turn, vary according to temperature, humidity, and ultraviolet exposure—to the development of sophisticated new air-quality sensors (“complicated sniffers,” he calls them).

“Many buildings already control fresh air intake with a CO<sub>2</sub> sensor, which is essentially a proxy for human occupancy—the more people in the space, the higher the CO<sub>2</sub> level in the return air plenum, and the greater flow of outside air the system is triggered to pull,” says Van Den Wymelenberg. “I imagine similar sensors placed throughout buildings that sniff specific bacterial, fungal, or viral strains and adjust airflow accordingly. These would analyze a range of biotic and abiotic [living and nonliving] variables simultaneously—outside air factors are also extremely important in that scenario, such as pollution or the particulate matter from fires that’s affecting air quality over half the United States right now—to determine the optimum airflow regime.”

Researchers at the BioBE Center measure the bacterial community from the surface of leaves, which host a rich microbial community.  
(Image: BioBE Center)



Humans constantly shed particles from their skin into the air. At the BioBE Center, the bacterial cloud people create is measured using a controlled chamber to remove the influence of bacteria from any other source.  
(Image: BioBE Center)

## The Mind-Body-Building Connection

Organizations like the International WELL Building Institute are significantly invested in substantiating the benefits to human health that are possible through conscientious design. The potential societal benefits, quantified in healthcare savings and numerous intangible benefits, are equally clear. The world’s most cutting-edge companies, institutions, and organizations also have recognized the fiscal benefits of integrating wellness in the workplace.

One example is the headquarters of the American Society of Interior Designers (ASID) in Washington, D.C. After ASID moved from its outdated office space to a new location that, in 2016, became the first LEED Platinum- and WELL Platinum-certified office space in the world, a tremendous improvement in employee satisfaction—and productivity—was noted. Employees worked 19 percent more than previously expected by their employers, with a 16 percent improvement in performance, “yielding an estimated increase of \$694,000 financial impact to the society’s bottom line during the first year of occupancy,” according to the case brief prepared by architecture and design firm Perkins+Will, which led the project. “[The new space is] expected to yield a \$7 million increase in financial impact during the total 10-year lease agreement,” given a consistent improvement rate.

ASID's new offices include significant improvements in air quality, sound quality, and lighting, each tied to science-based parameters for occupant health. But, according to Shimi Kang, MD, clinical associate professor at The University of British Columbia and creator of Dolphin Kids Achievement Programs, the most important thing to keep in mind about wellness-oriented design interventions is not to look at them in isolation, but rather as part of a holistic approach. The cumulative impact of simply feeling good, which requires different conditions for different people, is where the real gold is. Sometimes, those conditions are purely physical, but often they are psychological, which, in turn, can have significant impacts on physical health.

When working with designers, Kang, who writes and lectures widely on mental health topics, finds it helpful to frame the discussion around wellness in terms so obvious as to seem trite. However, she insists, they are anything but. "We've only been living indoors hunched over a desk and looking at artificial light for a couple hundred years. For most of human history, we were hunters and gatherers, which means the brain developed outside—in nature, in sunlight, standing upright, walking around—and in the context of exquisitely connected social groups. Those are some very powerful antidepressants," she explains.



The Dolphin POD: Achievement Center for Future-Ready Kids, in New Delhi, India, uses play as a catalyst for creativity. (Image: Dolphin POD)

Most people now spend 90 percent of their time indoors, yet we haven't really designed our lives to account for the health impacts of the lifestyle, says Kang. "We are living in an era of paradox: We have incredible advances in knowledge and technology, yet we've never had such high rates of stress and related illnesses. It's important for designers to realize that, in a way, they are psychiatrists—a healthy building is designed based on how our brains are actually wired."

Kang encourages designers to avoid configurations that could encourage a fight, flight, or freeze response. "In nature, that's a tiger roaring, a bird flying away in fear, or a deer freezing in your headlights. In an office, a 'fight' response might be anger or irritability; 'flight' is like checking out, distracting yourself with your phone, social media, or substances; and 'freeze' equates to anxiety and procrastination." When we become stuck on the fight, flight,



Play spaces—for children, as well as adults—encourage interaction and counteract loneliness. (Image: Dolphin POD)

or freeze hamster wheel, we're not operating from our cortical brain, she explains. "When we're functioning from the cortical brain, we are creative, we're great communicators and problem solvers, and we excel at collaboration."

Designing for those parameters might sound impossibly abstract, but Kang offers a straightforward example that knits them all together: play spaces. This doesn't have to be taken literally, she adds. Anything that encourages informal, spontaneous, face-to-face interaction counts. "We are fundamentally social beings, so it's important to design to promote eye contact and water cooler talk, whether it's in a lobby, meeting spaces, a games room, a kitchen, a community garden. This is why the most competitive corporations in the world are building playrooms; this is why Facebook has Nerf gun wars."

Kang says daily social bonding is essential for counteracting the other modern killer besides stress: loneliness. "It's part of the paradox. We're living in dense cities and connecting with people online like never before, but we have never had such high rates of loneliness, which releases chemicals like cortisol and adrenaline in the brain that are a big part of the fight, flight, or freeze stress response. Loneliness deregulates our immune system; cancer metastasizes faster in lonely people. The most effective form of torture on the planet is solitary confinement. And, we are doing it to each other."

## Wellness and Inclusivity

Mental health issues are not solely a product of our modern indoor lifestyle, of course. And, redesigning buildings is by no means a silver bullet for this, or any health issue. However, it is an increasingly proven way for design professionals to contribute to a healthier society.

That said, the ASID headquarters case study offers some concrete evidence that such changes do make a difference. At a minimum, ASID employees seem to be interacting with colleagues more. The preferred method for communicating with colleagues has shifted from emails to face-to-face interactions, and collaborative work has increased 9 percent in the new space. Of surveyed employees, 83 percent felt the new space “supports the sharing and exchanging of ideas,” versus 39 percent in the old space. Small interventions like orienting computer screens at a 20-degree angle away from the nearest window to reduce glare (and thus eyestrain) and a circadian lighting system (which mimics the daily fluctuation of color temperature found in natural daylight, which can impact everything from alertness and fatigue to blood pressure, metabolic rates, and cancer risk) are like little touches of TLC that add up to a more positive work experience overall.

Whitney Austin Gray, PhD, senior vice president for Delos Insights, which has placed health and wellness at the center of design decisions, notes that achieving these wellness goals in buildings requires designers to work in new and unexpected ways. For example, many of the most powerful interventions can become obsolete post-occupancy, unless structures are established that enable building and personnel managers to pick up where designers leave off. “In order to translate these ideas into practice, it’s often helpful to have a representative from HR on the project team early on so that you can discuss opportunities for workplace policies to dovetail with the design,” says Gray.

Gray also is a huge advocate for more inclusive thinking when it comes to wellness design. “When ASHRAE set the standards for thermal comfort, [it] literally based the model on a 40-year-old male’s physiology.” Women have different thermal needs, she points out, partly as a result of physiology and partly because they don’t wear heavy three-piece suits to work in the middle of summer.

Taking the idea of inclusivity a step further, Gray believes wellness design should focus on supporting the health of those who are most vulnerable, which inevitably results in buildings that are healthy for the population at large. “What about menopausal women in the workplace? What about those dealing with compromised immune systems? If you are back at work after recovering from cancer, what sort of sensitivities does that create? What if you’re older, overweight, underweight, short, or tall? All of a sudden, the work environment doesn’t fit you. By designing for the 5 percent who are least physically abled, we make buildings better for everyone,” she recommends.



Bright, open gathering spaces contribute to both light and nourishment, two of the concepts emphasized by the WELL Building Standard. (Image: Naomi Castillo)

As a simple example, she points to the importance of task lighting for folks who suffer from cataracts or other vision problems and find it difficult to read or work under overhead lighting, a solution that also helps those with perfect vision to maintain it. Another example: curb cuts. “They were designed for people in wheelchairs, but everyone uses them, including people with roller suitcases,” she notes.

A more complex example relates to the variability of temperature inherent within any building. “You’re never going to achieve the same temperature across the floor plate — it depends on where the vents are, where the windows are, what time of year it is — so let’s stop trying to make it all the same temperature. Instead, what happens if we mark on the floor plan where the temperature goes up or down 3 degrees? And then, we actually tell people about this and they can choose where they want to work,” she suggests.



Wellness design should focus on supporting the health of those who are most vulnerable, which inevitably results in buildings that are healthy for the population at large.



Biophilic design elements, like green walls and natural wood, are in play at Delos' headquarters in New York. (Image: ImagenSubliminal)



As passionate as she is about working towards a healthier built environment, Gray also recognizes that researchers must adopt a collaborative approach to bring that vision to fruition. "As a scientist, it's not my job to tell designers how to design for health. That would be pretty bold," she says, laughing. "It's like, 'read this peer-reviewed article on the appropriate lighting level for your eyes.' My designer colleagues are going to say: 'Okay, that's great; but what kind of light bulbs do we need? How much do they cost? Is the company making them going to go out of business next year? Because we have multiyear management contracts on the space.' That's where the breakdown happens. The most powerful way to translate research into practice is to know where our work stops and where the designers' work starts, and actually make that process more aligned and synergistic." ●

**BRIAN J. BARTH**  
is a freelance writer with a background in environmental planning and design. He has written for a range of publications, from Landscape Architecture Magazine to NewYorker.com.

No one knows a building better than its janitorial staff. Which is why U.S. Green Building Council Los Angeles (USGBC-LA) has established the Green Janitor Education Program, a training and certification program that empowers custodians to become sustainability stewards. A collaboration with Building Skills Partnership, the Service Employees International Union United Service Workers West (SEIU-USWW), and the Building Owners and Managers Association of Greater Los Angeles (BOMA-GLA), the Spanish-language program teaches the basics of sustainability, while training individuals to spot leaks and report electronic equipment that has been left on unnecessarily.

With more than 800 graduates across California, the 56 buildings that have enrolled in the program since it was founded in 2014 have realized an average energy savings of more than 5 percent as a result, and most of the buildings have seen significant water savings as well.

But, as USGBC-LA Executive Director Dominique Hargreaves explains, the program also includes a significant health and wellness component by encouraging the use of toxin-free green cleaning products. "Janitorial workers are sometimes afraid to switch because of a long-held misconception that green cleaning products don't work as well. As a janitorial worker, your job performance is gauged by how clean the building is, so making the switch requires a lot of demonstration," she says.

This not only is good news for employees working in those spaces, it's great news for the folks that are using the new cleaning products, adds Hargreaves. "Graduates of the program have told us that, when they made the switch to the eco-label products, they no longer experienced symptoms like watery eyes or a sore throat like they used to sometimes get." An added bonus: The certified janitors are taking their new knowledge back home to their communities, with many reporting their personal water and energy bills dropping as a result.

The program also is a prime example of keeping the sustainable initiatives rolling long after the architects and designers have left the building. "You can design a beautiful, sustainable building with local materials and no volatile organic compounds in the finishes," Hargreaves says, "But, if you then introduce toxic chemicals to clean that healthy space, it kind of negates the whole thing."



The Green Janitor Education Program has proven beneficial for both the graduates and the buildings that employ them. (Image: USGBC-LA)

Among the Southern California-area building owners already using Green Janitors are the Los Angeles Department of Water and Power, Sony Studios, CBRE (Pacific Corporate Towers), and DreamWorks Animation Studios. The program has moved up and down the California coast—from San Diego to Silicon Valley—via additional USGBC chapters and is poised to expand further as well, with USGBC chapters beyond California state lines expressing interest in implementing the program in their own regions.

By Emileigh Clare and Todd Sims

# Making Use of



Thanks to breakthrough R&D at Covestro, the inert carbon dioxide molecule can be put to practical use, creating flexible polyurethane foam for use in upholstered furniture, bedding and more.  
(Image: Covestro)



Chemistry and interior design share common goals for high-performing, sustainable products that advance the profession

# Every Molecule

The latest interior design products and materials aren't just found on trade show floors in major cities. They also come from high-tech science labs, driven by the research and development (R&D) teams of chemical manufacturing companies who are designing molecules with a focus on sustainability and wellness.

In these pioneering labs, chemicals are the building blocks for the latest high-performing materials *and* the products they go into—products that are enabling solutions to some of the world's most daunting sustainability challenges. Behind each of these products and materials is a team of dedicated scientists and a painstaking process that can take years, or even decades, to complete. Following are some examples of how interior design acquires some of its most innovative chemistry.

## Greener, Bio-based Carpet

For more than 200 years, DuPont has been developing innovative chemistry. One of its key research areas: bio-based products used in applications ranging from carpet, to apparel, to packaging, and more. The focus of this work remains the same across all applications—to create new technology that has a better sustainability profile than certain nonrenewable alternatives, without sacrificing performance attributes.

Today, some of the soft and resilient carpets in the marketplace come from a long-term DuPont research initiative. It started back in the 1950s, when DuPont scientists marveled over the unique properties of a close “cousin” of nylon, a new chemical compound they called “poly trimethylene terephthalate” (PTT). According to DuPont’s Michael A. Saltzberg, PhD, global business director of biomaterials at DuPont Industrial Biosciences, the scientists knew they had found something special, just by PTT’s microscopic structure. Up close, it looked like a fishing hook or the letter “J.”

“Scientists knew it was a cool molecule,” says Saltzberg. “They could tell that it would be as resilient as nylon, sometimes even better, based on that shape. And, also because of the nature of PTT’s chemical structure, they found that the shape repelled dirt and had built-in stain resistance [and could] offer more stain resistance naturally than other materials, like nylon, polyester, and polypropylene, that are also used to make carpet, for example. There was also an inherent stretchiness in the compound, which could be used to make very soft and resilient fibers.”

However, one major issue resulted from scaling up PTT for uses outside the lab. PTT had to be created from two different chemicals, terephthalic acid (PTA) and propanediol (PDO). At the time, PTA was widely available to make a variety of polyesters, but PDO was more difficult to scale for commercial uses. For that reason, PTT could not be made available on the market at a reasonable cost.

The science was temporarily put on hold, but not forgotten. In the mid- to late-1980s, DuPont started investing in a new type of science called industrial biotechnology. Saltzberg describes this as biotechnology focused in the areas of chemicals, materials, and fuels, which are key aspects of the green chemistry movement. “Our team working in industrial biotechnology determined that making the molecule PDO with a fermentation process using plant-based resources—very similar to how you make beer or wine, for example—was exactly the process we could use,” recalls Saltzberg.

Michael A. Saltzberg, PhD,  
DuPont Industrial Biosciences  
(Image: DuPont)



For about 10 years, DuPont scientists worked on modifying microorganisms to create the new bio-based PDO that would ultimately make the bio-based co-polymer Sorona. At times, hundreds of people and scientists worked on this project, according to Saltzberg. In fact, the program to develop a bio-based route to PDO and the Sorona co-polymer was one of the largest R&D programs for the company at the time.

In 2003, the U.S. Environmental Protection Agency (EPA) presented DuPont Sorona with its Presidential Green Chemistry Challenge award, which acknowledges chemical technologies that “incorporate the principles of green chemistry into chemical design, manufacture, and use.” By 2006, Sorona, comprised of 37 percent PDO, was creating soft, stain-resistant carpets from renewable sources and the innovative science behind it still is garnering acclaim. In 2017, Frost & Sullivan named DuPont Industrial Biosciences the Bio-based Materials Company of the Year for its continued research and innovation in the biomaterials space.

“It’s really groundbreaking science to make a product like Sorona. At DuPont, we focus on new sustainable approaches that maximize the use of renewable resources,” notes Saltzberg. “It’s just the way we do chemistry.”

Over the past 12 years, DuPont and Mohawk Industries scientists have teamed up in an exclusive partnership to take the chemistry of carpets even further. As part of their partnership, Mohawk has created new product lines using DuPont chemistry, such as “SmartStrand,” in which each strand of carpet is packed with 700 silk-like, stain-resistant fibers to provide incredible durability and softness. In addition, both DuPont and Mohawk R&D teams have continuously found ways to lower the environmental impact of Sorona and the products made from it.

DuPont’s Sorona co-polymer is used  
to create soft, stain-resistant carpets.  
(Image: DuPont)





Covestro research has proven CO<sub>2</sub> offers an alternative and plentiful carbon source for the production of flexible polyurethane foam.  
(Image: Covestro)



Berit Stange, PhD,  
Covestro  
(Image: Covestro)

## Transforming CO<sub>2</sub> into Sustainability

Covestro AG, one of the world's leading manufacturers of high-tech polymer materials, is pushing a new perspective within the industry, by demonstrating how carbon dioxide (CO<sub>2</sub>), a main contributor to global warming, can be captured and used for good.

Experts have been searching in vain for nearly half a century to solve this scientific challenge, according to Berit Stange, PhD, venture manager at Covestro. Now, thanks to a breakthrough technology, the inert carbon dioxide molecule can be put to practical use, creating flexible polyurethane foam that can be employed to make sustainable mattresses and furniture.

"For many years, we have known that CO<sub>2</sub> is one of the primary greenhouse gases emitted into the Earth's atmosphere, but there hasn't been a practical way to use it," explains Stange. "By reducing our dependence on nonrenewable feedstocks, CO<sub>2</sub> gives us an alternative—and plentiful—carbon source for polyurethane production." While flexible polyurethane foam is not a new material to interior designers (it is commonly used in upholstered furniture, bedding, and carpet underlay), it has not been widely made with CO<sub>2</sub> until now.

To start, chemists at Covestro discovered they could manufacture a CO<sub>2</sub>-based polyol—later branded as cardyon—to create polyurethane flexible foam. Traditionally, polyurethane flexible foam is made using a variety of raw materials, including polyols that react with isocyanates to create flexible polyurethane foam. Chemistry *and* collaboration were critical to discovering that the polyol portion of polyurethane could be made with CO<sub>2</sub>.

"There were a lot of challenges in the process," recalls Stange. "Because CO<sub>2</sub> is an inert molecule, it typically requires a large amount of energy to make it react. However, if more CO<sub>2</sub> is generated at the end of this process than is saved by incorporating it in the first place, the result would be neither

ecological nor economical. We needed to find a suitable reactant and the right catalyst to activate the CO<sub>2</sub> without generating more."

Once scientists made this discovery, the research and development phase for the chemistry began. At the time, Covestro operated a pilot plant in Leverkusen, Germany, sourcing CO<sub>2</sub> from an adjacent power plant. The team manufactured CO<sub>2</sub>-based polyols for testing, until achieving the desired quality in terms of softness and comfort.

Presently, CO<sub>2</sub> content in the cardyon polyol grades are up to 20 percent. Not only is the resulting foam comparable to conventional foam, but the use of CO<sub>2</sub> in polyurethane foam production benefits the environment by reducing the overall carbon footprint and establishing an alternative carbon source beyond fossil hydrocarbons and bio-based raw materials.

According to Stange, the new material is a valuable resource that can give interior designers a new, innovative option to consider when designing for clients who want to live a certain lifestyle. "You can sleep soundly knowing you're doing something good for the planet," she adds. "And, for those in the business of chemistry, CO<sub>2</sub> is no longer the enemy; it's part of the solution for more sustainable materials."

Currently, the cardyon polyol for flexible foam production is commercially available on the European market, and several other cardyon grades are available for thermoplastic polyurethanes and coatings. Covestro has additional R&D projects underway to use CO<sub>2</sub> in many different types of plastics, including rigid and molded foams and elastomers.

## Both a Textile and a Medical Device

A textile that can help blood circulate after the usual 9-to-5 weekday stagnation? Thank chemistry, and the R&D teams at surface materials company Designtex and technology company Hologenix. These teams have produced Celliant, a responsive upholstery that can help combat some of the harm of too much time at a desk or on a sofa. After nearly two decades of research on the science, Celliant's health claims have been backed by clinical trials, and the material has been approved as a medical device and general wellness product by the U.S. Food and Drug Administration (FDA), as defined in Section 201(h) of the Federal Food, Drug, and Cosmetic (FD&C) Act.

Celliant works by temporarily promoting increased local blood flow in healthy individuals. The fabric contains a patented, natural blend of minerals, which recycles the body's naturally emitted infrared energy and sends it back to be reabsorbed by tissue and muscles. Clinical studies have shown this material can cause increased circulation and oxygen flow for the user.

According to Deidre Hoguet, director of applied research at Designtex, Celliant works through its unique chemistry embedded into the core of its recycled polyester fiber. Some of the minerals included are aluminum oxide, silicon dioxide, and titanium dioxide, all of which are found on the Earth and in everyday products like toothpaste and sunscreen. "The main chemistries in the product are recycled polyester from PET [polyethylene terephthalate] bottles and safe, naturally occurring minerals," says Hoguet. "It's a very simple product with a wonderful benefit."

Designtex also has created a universal, nonwoven Celliant textile backing that can be applied to the company's wide range of upholstery, offering the benefit to many types of interiors and end-users. "We've all heard that sitting is the new smoking and a lot of us who work in the interior environment are trying to combat that with standing desks or helping people be more active inside of a building," notes Hoguet. "But, for periods that we do have to sit, we are really happy to have this option, which can help people through improved circulation. At Designtex, we really believe in using our material chemistry knowledge to continuously improve our products' contributions to human health."



ABOVE AND BELOW: Celliant textile upholstery and nonwoven backing are the first to introduce minerals to seating, where they can reflect the infrared energy individuals emit back to their bodies. The result is increased circulation and oxygen flow to the individual.  
(Images: Designtex)



## Journey to WELL

Milliken & Company has a long history of combining science with design, offering insights in creating specialty chemicals, floor covering, and performance materials for interior design applications. Through research and innovation efforts in chemistry and material science, Milliken has been granted more than 2,500 U.S. patents and more than 5,500 patents worldwide for its products and materials, including flame-resistant textiles and plastic antioxidants that can improve indoor air quality.

Milliken's latest chemistry challenge? Creating an innovative space for its celebrated commercial design showroom at Chicago's theMART, and receiving the first WELL Platinum project certification in the Windy City.

The reasoning for Milliken was simple.

"We wanted to show how our materials can help meet important standards and put wellness into real-life action by working with the International WELL Building Institute (IWBI)," says Milliken Floor Covering Strategic Sustainability Leader Philip Ivey. "Certifying our Chicago showroom at theMART was a natural next step for Milliken to better understand the WELL Building Standard and how to implement it. It provided us the opportunity to share our learnings along the way with our customers."

The process wasn't an easy one. According to Ivey, obtaining Platinum at theMART was not the company's original intent, due to the stringent requirements for Platinum and a six-month period to complete the certification before NeoCon in early June. Using the WELL Retail pilot standard allowed Milliken to achieve all required "Preconditions," plus 80 percent of the "Optimizations." Chemistry and material science expertise gave Milliken the edge it needed to receive the highest achievement possible from IWBI.

"We originally planned to try for a Gold-level certification. But, as we got into the project, we realized we had the potential to get certified at a Platinum level due to these changes," explains Ivey. "This was accomplished by achieving most of the material-related credits, working closely with the landlord, and being creative where we could be."



Milliken & Company achieved WELL Platinum certification for its showroom at theMART in Chicago, noting its commitment to embracing wellness from the top down. (Image: Milliken & Company)



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Milliken carpet tiles and luxury vinyl tiles are among the flooring materials that can contribute to WELL certification. (Image: Milliken & Company)

The Milliken team navigated the WELL certification process by focusing on how materials contribute to the current standard—using chemistry expertise to source materials with high ingredient transparency, low toxicity, and low volatile organic compound (VOC) emissions.

According to Ivey, Milliken carpet tiles and luxury vinyl tiles are both flooring materials that can help contribute to features in the WELL certification through low VOC-certified materials; public transparency of ingredients; and other product attributes, such as polyurethane-cushion carpet tile's acoustic advantages, as well as incorporating biophilic design principles. Ivey notes exciting changes for those interested in using WELL for material considerations. Materials now are broken out into their own "Concept" in the newly released WELL version 2 pilot standard.

"Interior designers are enthusiastic about the WELL Building Standard and its focus on people," says Ivey. "We often lose sight of the fact that we spend 90 percent of our time indoors and that the largest expenditures over time for workspaces are employee salaries and benefits. Productivity matters for the long-term cost effectiveness of a building; it's about finding creative ways to enhance people's lives. For us, the certification of our Chicago showroom is a way to show our commitment to that using our knowledge of the science."

At its core, for these companies and more, the business of chemistry is all about science—science aimed at driving innovations in products and technologies that help make our lives healthier, safer, and more sustainable. ●

#### EMILEIGH CLARE

*is a communications manager at the American Chemistry Council (ACC), where she focuses on sharing information on chemistry and chemical safety. Currently, she is a candidate for a Masters of Public Health at George Washington University, where she researches health and science literacy.*

#### TODD SIMS

*is director of sustainability and market outreach at ACC, where he manages partnerships and outreach to support safe, sustainable, and resilient buildings and building materials. He works with key stakeholders throughout the supply chain to develop and promote innovative approaches.*



## Talking to Your Clients about Chemistry

The word "chemical" has been known to strike fear into many people's minds. It is understandable—opportunistic marketers often tout that a variety of products are somehow "chemical-free."

Chemical-free is not possible. Everything is made of chemicals, even water and air. Many people who ask about chemicals are actually concerned about whether there is a health risk from a particular chemical (as in, can a material or product harm them?). The level of risk posed by a chemical ingredient is not just determined by the physical properties of the chemical itself, but depends on a range of factors, including how a person is exposed to the chemical, at what concentration, and for how long. Even coffee and water can be harmful to a person at high enough doses, becoming potential concerns in certain circumstances.

As an example, the mineral titanium dioxide in dust form is classified as an inhalation hazard, but when titanium dioxide is in wet form, as in paint, there is little to no risk of inhalation. Scientists classify hazards based upon test results that address exposure to a chemical in its pure form. Generally, most chemical manufacturers are required to use the World Health Organization's Globally Harmonized System of Classification and Labeling of Chemicals (GHS), which provides a global framework for hazard testing, classification, and labeling. In compliance with GHS, manufacturers provide a Safety Data Sheet on the chemicals they produce or distribute that identifies each chemical's properties and information on safe use and handling.

#### What about VOCs?

Some carpet may emit volatile organic compounds (VOCs) during installation. However, these emissions can largely dissipate within 24 to 48 hours, or even faster with fresh air ventilation. The U.S. Environmental Protection Agency (EPA) advises ventilating for at least 72 hours. Once installed, carpet may actually improve indoor air quality by keeping allergens out of the air. The EPA states that if it is "kept very clean from the time it is installed, carpet can trap a significant amount of particles, which can be removed through regular and effective vacuuming."

#### Chemistry Questions?

You don't have to take college-level chemistry to get up to speed on the latest material science. For interior designers and architects, the American Chemistry Council has developed [BuildingwithChemistry.org](http://BuildingwithChemistry.org) as a resource for material safety information, along with a series of educational courses for credit from the Interior Design Continuing Education Council (IDCEC).



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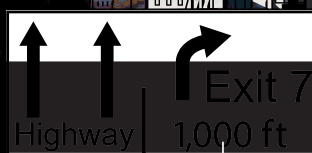
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Sherwin-Williams' Enthusiast palette features bold pops of vivid color for maximum impact and energy.  
(Image: Sherwin-Williams)



By Diana Mosher

# Color, in Theory

Psychology steers  
the colors that  
express and influence  
how we feel



## Color Therapy

In the important work of designing environments, color is a vital and defining catalyst and one that speaks to much more than one particular space. Before the internet and our modern 24-hour information cycle, some color theorists gauged the state of the economy and consumer confidence by watching which red tones were trending. A brighter blue-based red (more positive and upbeat) would emerge as the economic outlook looked good and consumers were confident. However, if people were worried and not inclined to spend as much, a brown-based, earthy red would become popular because it felt safer and, particularly in home design, people believed they could live with it for longer.

Today, these general guidelines still ring true and speak volumes to the psychology behind the colors we choose for everything from fashion to interiors to automobiles and more. “When the financial crisis hit in 2008, colors were a little somber. I do think that now cycles move faster because there’s so much more information [coming at us],” explains Sue Wadden, director of color marketing at Sherwin-Williams. Fashion always gets a lot of attention, but it’s no longer the absolute leader in color forecasting with everyone else in the design world following suit. Travel and film also inspire color palettes, and forecasters are particularly interested in cutting-edge technologies and finishes that incorporate new colors.



Color forecasting mood boards, like this one from CMG, are a collection of images, words, art, and more that evoke emotion and support an emerging color's story. (Image: Color Marketing Group)

Wadden looks to the automotive industry as an economic barometer. She notes that when brighter, bolder colors—including red, certainly, but also impactful colors like yellow or citrus green—emerge in auto colors, you can tell the economy is doing well; whereas, when black, grays, and deep reds—those merlot and yellow-based tones that are a little more conservative—emerge, people are becoming worried.

Everybody can relate to the importance of color around them, whether they're overtly aware of it or not, according to Leatrice Eiseman, executive director of the Pantone Color Institute and director of Eiseman Center for Color Information and Training. “Some people are so tuned in to color because they’ve been raised in a very colorful atmosphere or they have a natural talent for it. But, even those who don’t have that particular talent know what it feels like when you walk into a space that makes you feel good, that lifts your spirits, or depresses you,” she states.

Eiseman often is asked, “What color can I paint the office to increase productivity?” Unfortunately, no magic bullet set of colors will work in any given setting. Eiseman recalls that, in the days before computers, people would call Pantone and say, “We get that it’s important to match colors, but tell us about how color makes you feel. How can we help sell our widgets based on the color that they’re made?” As time went on, the Pantone Color Institute was established because Pantone realized there was much more to color than the technical aspects of color matching.

“We know the psychology of color is so powerful in the home and equally important in the workplace where some people spend eight to 10 hours a day,” says Eiseman. “In a healthcare facility, of course, color is also a very important consideration because it can depress or enhance the mood of people within that setting.” Designers almost intuitively gravitate toward calm colors that will create a relaxed setting in healthcare projects, but, at the same time, it should not be so soothing that it crosses over to depressing. “Colors in healthcare shouldn’t be too muted and they should give you the feeling of a little bit of connection to [nature] outside,” explains Eiseman, who does not use the word “rules” when talking about color. “I prefer the word ‘guidelines.’ We decide on the mood we are going to create and then color helps us create the mood.”

## Appealing to Emotion

Using colors to create workspaces that inspire creativity, collaboration, and productivity is a key business concern, but color plays a much wider role in achieving success. A company’s brand image will connect with its consumer when colors are selected that emotionally engage their market. “Products utilizing colors that speak to the consumer’s mood, persona, and culture will increase sales,” notes Sandra Sampson, vice president of PR and communications and executive board member at Color Marketing Group.



Sue Wadden,  
Sherwin-Williams



Leatrice Eiseman,  
Pantone Color Institute  
and Eiseman Center  
for Color Information  
and Training  
(Image: Pantone)



Sandra Sampson,  
Color Marketing Group  
(Image: Forrest Fields)

With copper and gold anchored by merlot, gray, and charcoal blue, the tailored tones of Sherwin-Williams' Aficionado palette make a tasteful and elegant statement.  
(Image: Sherwin-Williams)

According to Sampson, online user experiences also are influenced positively by the right colors. Emotional associations with colors are known throughout the world. However, cultural and personal experiences create variations in color meanings or associations. When a designer selects colors for a brand's message—for logos, stationery, or digital media—the meaning of colors selected needs to achieve an emotional connection with the audience.

Designers, of course, know the significance of context in selecting the right color for interior spaces. Color preference varies with gender, age, culture, seasonal influences, educational development, religion, lifestyles, personality type, and personal experiences of the client. "By observing the client and listening to their stories [and] likes and dislikes in color, material, and finishes, a designer will be able to find the perfect color-emotion connection," says Sampson.



Pantone's Home + Interiors 2019 serves as a guide through the colors that will influence the year ahead.  
(Image: Pantone)

## Color Today

According to Wadden, who works on color forecasts at Sherwin-Williams, important key colors (colors of the decade) run in 20- to 30-year cycles. "We saw gray and mauve in the '80s. That was a key color particularly in commercial design, but also in home décor, and it's interesting that gray about five years ago really started to gain momentum," she says. "We had been in a beige existence in the decade prior, so it was time for gray to come back. But, now, people are seeking a bit more balance and warmer hues. That's where 'greige' is coming in—to bridge the gap between gray and what's next."

Wadden notes the last five years or so were about Scandinavian design, minimalism, getting back to the essence of just one thing, and simplification. "I think we're emerging from that," she says. "In Milan, at last year's Salone [del Mobile.Milano], furniture designers were exploring the maximalist trend. Color and pattern and texture and vibrancy have really taken hold and, in the last 12 months, we've seen an explosion of color in fashion, hair, and interior design."

## Colorful Careers

Those who follow their passion to become color design specialists typically start with training in interior design, industrial design, fine art, graphic design, or color science. Universities, independent schools, and workshops offer targeted education about color theory and science, and how they are applied in industries. Color design professionals can work in a variety of settings, such as manufacturing, marketing, product development, packaging, digital marketing, art, sales, education, and interior design.

Specialists note working in color is an unending exercise in discovery and that talking to clients about color can lead to amazing personal stories

about things they have long since forgotten. According to Eiseman, you remind clients of why they may like or dislike a color, essentially what may have happened in their childhood that turned them on or turned them off. “If you’re really dedicated to the idea of *that* color for *that* product, and you can make an earnest appraisal of it and give them facts to support it—but also find out why they dislike *that* color—that can take you on an amazing path with a client.” ●

**DIANA MOSHER**, Allied ASID, is a New York-based interior designer and media consultant. She also is the 2017-2019 communications director for the ASID New York Metro chapter.

Color forecasting facilitators collaborate through the process of steering North American forecasts from the Color Marketing Group. (Image: Color Marketing Group)



## Neuroaesthetics Comes of Age



Scientists know we’re affected by beauty in people, landscapes, artifacts, artwork, and architecture—but how and why is a deep and interesting mystery. Neuroaesthetics is an emerging field of research that studies what happens in the brain as people experience beauty, and how the brain triggers aesthetic experiences. As far back as 300 years ago, British philosopher and statesman Edmund Burke wrote about the way in which our physiology might have an effect on our aesthetic experiences; but, the science of neuroaesthetics was only established 18 to 20 years ago. The term neuroaesthetics was coined in the 1990s by vision neuroscientist Semir Zeki of University College London.

“The methods and approaches of cognitive neuroscience, when they had matured enough, could then be applied to aesthetic experiences in the same way that they had been used to study language, emotion, perception, or decision-making,” says Anjan Chatterjee, MD, the Frank A. and Gwladys H. Elliott professor of neurology and chief of service at Pennsylvania Hospital and director of Penn Center for Neuroaesthetics at University of Pennsylvania. “The field represents a convergence of neuroscience and empirical aesthetics—the study of aesthetics rooted in observation.”

In June, Chatterjee was named director of the newly opened Penn Center for Neuroaesthetics,

the first research center of its kind in the United States and a clear indicator that the field is coming of age. In the first six weeks after the launch of the center, he was contacted by multiple commercial enterprises to discuss possible collaborations. “I do think people will be interested in this as a scientific discipline to try to underpin how one might think of design of spaces and design of objects with the goal of making them more appealing,” says Chatterjee.

“In my lab, we have been looking at certain aspects, which are common to all interiors,” adds Chatterjee. Examples include how high or low is a ceiling, how open is a space (whether there is a window or a wall that allows you to look past the space beyond the physical confines of that space), and whether the interiors are more rectilinear or curvilinear.

In addition to MRI scans, neuroaesthetics employs behavioral research with detailed interviews that look for consistency in responses. When Chatterjee and his team show people images of interiors, the reactions to those spaces tend to fall into three basic components:

- 1) How coherent does the space appear to be;
- 2) Does it possess a fascination component—do people feel like entering and exploring the space; and/or
- 3) Whether there’s a familiarity or hominess.

“We are able to take what is a fairly complicated response and reduce it to some principal components that might apply to everybody in these kinds of spaces,” Chatterjee explains.

“We have found that these different components have different neural signatures, so the ways our visual system responds to each of these are slightly different,” he adds. “There’s also a longer-term evolutionary argument, which is our brains have evolved to appreciate certain configurations of line and color and form that we find attractive.”

As the science of neuroaesthetics continues to evolve, its findings will provide designers with new insights and a more nuanced understanding of their clients and how those clients are experiencing spaces. This important research promises to enrich the design process—and outcome—for both residential and commercial projects.



Anjan Chatterjee, MD, Pennsylvania Hospital and Penn Center for Neuroaesthetics, University of Pennsylvania



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ICONic Profile



**Jason F.  
McLennan**



Jason F. McLennan lives on Bainbridge Island, Washington, reached by ferry from Seattle, where he and his wife, Tracy, built their home, Heron Hall. Here, they're raising their children: Rowan, 10; Aidan, 12; and Declan, 15 (their oldest, Julian, 22, lives in Seattle). The house, which is solar-powered and provides all of its own water, is on about an acre of land next to an estuary and a salmon stream, a place where eco-systems meet—land, marsh, forest, meadow, and fresh and salt water.

It's a suitable place for the head of McLennan Design and one of the leaders of the green construction movement. Among his many honors, McLennan won the coveted Buckminster Fuller Challenge, the top prize for sustainable building and design. The author of six books, including *The Philosophy of Sustainable Design* and *The Ecological Engineer* (co-author), he is both an Ashoka Fellow and Senior Fellow of the Design Futures Council. McLennan is the chair of the International Living Future Institute and founder and creator of the Living Building Challenge and Living Product Challenge.

McLennan Design's work can be seen in many forms across the United States and Canada, including educational campuses, corporate buildings, residential housing, and in the hospitality industry.

Born and raised in Ontario, Canada, McLennan was educated at the University of Oregon and The Glasgow School of Art in Scotland.

He spoke with i+D from Heron Hall.

**i+D: How did you come to name your house?**

**McLennan:** It's for the heron that lives in the estuary next to us. I wanted the house to be romantic and magical for our kids. I remembered reading *The Wind in the Willows*, one of my favorite books, and in it is Toad Hall. Why not Heron Hall?

**i+D: What was the first thing you designed or built when you were a child?**

**McLennan:** I was always drawing castles.

**i+D: One of my all-time favorite book titles is yours: *The Dumb Architect's Guide to Glazing*.**

**McLennan:** It pokes fun at our profession, and asks that we not take each other too seriously.

**i+D: No, architects taking themselves too seriously?**

**McLennan:** (Laughing) We don't know everything and we should give ourselves a chance to learn.

**i+D: What is regenerative design?**

**McLennan:** Leaving a better place as a result of designs we do when we get to those places. Healing the planet, healing a community, and not keeping the status quo, but improving on it. Increasing habitat. Improving the watershed. Bringing life back to an area.

**i+D: Leaving a lighter footprint?**

**McLennan:** That's trying to be less bad. We want to be good, to have a footprint that has a positive effect.

**i+D: What do you always have with you?**

**McLennan:** A necklace I wear, a "koru" from New Zealand, hand-carved from bone into a swirl. It's a symbol of regeneration that my wife bought. The custom is to give it as a gift, but the giver has to wear it for a period of time to impart their energy into it before giving it to you.

**i+D: Beautiful.**

**McLennan:** Yes. From the Māori tradition.

**i+D: Where's the place that environmental science and design meet in the creative process?**

**McLennan:** They're not separate. There's no beginning and no end—it's embedded in our thinking as we design.

**i+D: What are you reading?**

**McLennan:** *Sapiens: A Brief History of Humankind*. And, a book on boating to learn what I need to know to get out into Puget Sound.

**i+D: With so much information being processed through visual media, is it necessary for architects and designers to read history, science, the social sciences, biography, and fiction?**

**McLennan:** It's absolutely necessary. Architecture and design are two of the last generalist professions. We have to know a wide variety of subjects—knowing a little about a hell of a lot. There's nothing that's not relevant to architecture and design.

**i+D: Looking at rollbacks of environmental regulations in almost every industry in the United States, what's the strategy to convince policymakers to adopt green mandates?**

**McLennan:** In some political environments, it's not worth trying to convince them. We do it by influencing people through constructing better buildings. Our buildings are healthier and more beneficial economically. That's why green building is still growing despite a lack of good public policy. If you build better and it's better financially, you win. That's the way commerce works. Once something is cheaper and better, it's adopted immediately, regardless of policy.

**i+D: When you wake up, how long is it before you think about work?**

**McLennan:** It's pretty quick. (Laughing) Oh, yeah, absolutely.

**i+D: What advice would you give someone entering the profession that you wish you'd received?**

**McLennan:** Don't worry about the math. You do more math in school than you ever do in practice. I don't know how many people I've heard say, "Oh, I was going into architecture, but I couldn't get the math."

**i+D: Like the idea that lawyers are doctors who were scared of chemistry?**

**McLennan:** Yes. Another piece of advice no one told me—be prepared to work hard.

**i+D: What exasperates you?**

**McLennan:** Politics today. There's a lack of truth, compassion, and intelligence.

**i+D: What elevates you?**

**McLennan:** The natural world. Great writing and art. Thoughtfulness. My kids.

**i+D: What's wrong with design today?**

**McLennan:** That most things are not designed at all, just slapped together and carelessly made. Lots of things are manufactured, but not designed. And, also, people aren't thinking about the consequences of their designs in terms of upstream and downstream impacts to the planet and people.

**i+D: What inspired you to pursue your profession?**

**McLennan:** The architecture itself. And, the idea of creating something that wasn't there.

**i+D: When you look up from your desk, what do you see?**

**McLennan:** Trees.

**i+D: Anything else?**

**McLennan:** Trees are enough. ●

**AMBROSE CLANCY**  
is the editor of the Shelter Island Reporter and a novelist, nonfiction author, and journalist. His work has appeared in GQ, The Washington Post, and Los Angeles Times.

# Inspiring Work By Michele Keith at Home

**Health and wellness research contributes to a visually appealing home office conducive to comfort, productivity, and better physiological functioning**

According to research-based consulting organization Global Workplace Analytics and FlexJobs, the online search firm for professionals seeking remote, flexible schedule, part-time, and freelance jobs, 3.9 million U.S. employees, or 2.9 percent of the total U.S. workforce, work from home at least half of the time. And, according to Gallup, as of 2017, 43 percent of employed Americans now work remotely at least occasionally. Further, a 2017 report from Canadian firm Regus shows just under 50 percent of business professionals in Canada working remotely at least 2.5 days per week, with 11 percent working remotely 100 percent of the time.

How are they doing this? Have they commandeered the kitchen table? Turned the guestroom into an executive suite? Has the entire concept of a home office changed?

*i+D* spoke with interior designers, as well as manufacturers, designers, and retailers of home office furnishings, to get their take on the topic. The experts shared the plusses and minuses of working at home and shed light on how to create a home office that allows the resident to “close the door and go home” at the end of the day—even when there is no actual door.





An ergonomic chair, height-adjustable desk, and desktop accessories help bring a new level of productivity to the home office. (Image: Knoll)

## Three Big Gets

When outlining the personal- and work-based preferences clients seek in their home offices, industry experts point to three primary themes:

“What do people want for their home offices?” asks Adam Taft, sales director at Monk Office, with locations throughout Vancouver Island. “It’s a trifecta of style, functionality, and ergonomics.”

“...the challenge is to ensure our [office] products feel at home in softer, warmer environments, while still providing the same high-performance functionality,” notes Mesve Vardar, director of industrial design at Humanscale in New York.

“The future of the home office is the seamless extension of the workplace, where individuals can pick up where they left off without interruption or compromise in performance and comfort,” says Toronto-based Susan Somers, vice president, Knoll Canada.

## Work/Life Balance

Chicago-based interior designer Susan Brunstrum, principal of Studio Brunstrum, says, “A home office space is a ‘given’ now, even in newly built, luxury rental apartments.” But, when working at home, “personal boundaries can be an issue. The place you use as an office can be an entire room, a closet, a nook, or just a corner, but it *must* be defined as *your* workspace. Using the kitchen counter or master-bedroom bed blurs the line between work and other activities, so the space becomes shared and multifunctional. To be your most creative, productive, efficient self, the space must be *your own*.”

Headquartered in Calgary, Melinda Richardson, principal of Premise Design, notes, “Ideally, the home office is located so that it can be hidden from the rest of the home. But, that can’t always happen. When it’s exposed...I focus on solutions to deal with clutter. Sometimes, that means a secretary desk so [my client] can ‘leave work’ by folding up their desktop and hiding it from view. That simple act of closing something can be the trigger to switch to personal time.”

Last, and agreed upon by the other interviewees, she says, “It’s imperative that pieces coordinate with the rest of the home so they blend in, helping the client to not feel assaulted by seeing their office space during personal time.”

But, “it’s easy to get distracted—laundry, dishes, young children—when you’re ‘at work,’ in the home,” says Jolanda Slagmolen-Flores, co-owner and general manager of Casa Flores Custom Cabinetry, also in Calgary. “On the other hand, when you’re ‘at home’ you can be tempted to tackle work commitments if they’re sitting right in front of you. The best solution, of course, is to have a space conducive to getting your work done, and, most important, to be able to hide everything away—printer, laptop, paper, etc.—when finished for the day.”

It sounds good, but many studies show a down side. One, revealed in the “The State of Remote Work 2018” report from research firm Buffer, found that while “90 percent of remote workers plan on working remotely for the rest of their careers,” loneliness (21 percent), collaborating and/or communicating (21 percent), and distractions at home (16 percent) are their biggest struggles.

One way to lessen the feeling of loneliness is broached by Brunstrum. “Often, we place two desks (his/hers) in one office. It’s a question of space, the work being done, and functionality, of course, but it can help.”

Clever storage systems in home offices can maximize every inch of space.  
(Image: Casa Flores Custom Cabinetry)



Sleek furnishings that incorporate natural materials and encourage proper form can make the home office a more comfortable place.  
(Image: Knoll)

## Ergonomics and Research

“Our philosophy is to approach design from a functional, problem-solving perspective,” Humanscale’s Vardar explains. “Throughout the product life cycle, we work closely with our team of in-house, board-certified ergonomists, as well as rigorously prototype and perform user-testing to ensure unparalleled quality and performance. Sustainability, too, is a huge part of our mission...from the very beginning of the design process.”

“We are the Vancouver Island Herman Miller dealer,” says Taft, “and look to them for innovation and new product. Herman Miller is first and foremost a research and design firm. And, as they say, ‘Every real design solution begins with research,’ which ranges from the study of the body—movement, muscles, etc.—to the six fundamental human needs: achievement, autonomy, belonging, purpose, security, and status. This approach means we always have something new, like the soon-to-launch Cosm chair.”

Continuing on the topic of research, Somers of Knoll says “we conducted a number of studies prior to introducing the Generation chair. One was a video of people working at their desks. At first, they sat posture-perfect. As they forgot about us, however, they began to relax and sit as they normally would, cross-legged, leaning backwards, hunching forward, one leg over an armrest, an arm over the back, etc. The chair performs perfectly because its elastic design and eco-friendly material innovations respond to user movement—an engineering detail resulting from the research. By the same measure, our research into the contemporary workplace resulted in our collaboration with David Rockwell to introduce his Rockwell Unscripted furniture.”

Another important research topic is lighting, according to Vardar. “Our latest research is looking at the benefits of biological lighting for enhanced health and wellness at work. So far, we’ve developed a few prototypes with lighting technology designed to increase productivity by mimicking the physiological effects of sunlight. This effect offers health benefits, thanks to improved circadian rhythms and hormone regulation in the body. Biological lighting could help people feel healthier, happier, and more productive,” she explains.



A smaller space can become an ideal home office—especially when it is carefully designed to maximize the floor plan.  
(Image: Premise Design)

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## Living by Design Home Offices

Sleek, easy to use, and comprised of sustainable materials, Humanscale's QuickStand Eco sit/stand desk line features simple setup and affordability. (Image: Humanscale)



## Sit/Stand Desks

While standing desks have been around since the 17th century, today's products are getting an inordinate amount of attention. Notes Taft, they're "an evolving trend, the key aspect being the addition of form to function, with technology starting to play a role. Sit/stand desks are connecting to networks and adding automation. They can now recognize who you are through your phone and adjust to your personal settings. They can also suggest when you should stand or sit."

Richardson believes sit/stand desks are "great if easy to use and the client understands the principles of how to use them properly. I think they're here to stay because of the increased awareness among the public of our health and what we can do to be healthier. Also, they're becoming more financially accessible."

Vardar says Humanscale is "seeing an increase in people implementing sit/stand solutions in their home office. Because they can be expensive, there's been an increase in consumer-friendly options...such as our QuickStand Eco, an easy-to-use, retrofittable sit/stand workstation; it's affordable and anyone can set it up themselves."

Indeed, the need for more residential-looking and multipurpose office furniture is being answered by these and other companies. From timeless classics—think Herman Miller's Eames lounge chair, to such new introductions as Knoll's Muuto collection, to Humanscale's Horizon 2.0 light fixture and Trea chair—furnishings are available that work with any décor, every personality, and the full scope of business and personal needs. ●

## Furnishing Forward

The biggest trend, agreed on by all, is that technology continues to get smaller and more portable. For example, says Slagmolen-Flores, "Wire management is no longer an issue because everything is becoming wireless. Equipment, such as printers and laptops, are becoming smaller. This makes it easier to design the space and make it less office-y."

Somers adds, "The home office has evolved and can be ideal for conference calls, reading, or focused work. A technological device is all one needs...along with the perfect chair. It's a complete transformation from offices of old with a large desk, storage unit, and bulky computer."

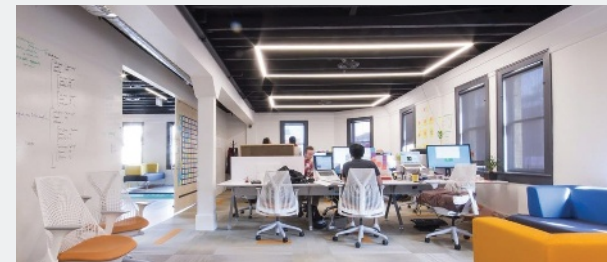
Augment this with the customization offered: Knoll's portfolio includes the KnollStudio furniture, Spinneybeck leathers, and FilzFelt architectural products; Monk offers a variety of finishes, such as a new formcoat and wood and veneer surfaces; and Humanscale is continually improving such items as its new QuickStand Under Desk that allows users to alternate between sitting and standing without interrupting workflow.

As for aesthetics, Richardson says, "Clients now desire more style in their home office. Before it was functional utility in the approach with minimal expenditure. Now, there is more focus on creating a special place that is conducive to productivity and looks great."

The Trea chair offers intuitive comfort by mimicking the instinctive recline of the human body. (Image: Humanscale)



Taking cues from the professional workplace, ergonomically correct furnishings, proper lighting, and other influences have made their way to the home office. (Image: Monk Office)



### MICHELE KEITH

is a New York-based writer whose work has appeared in *The New York Times*, *ASPIRE Design and Home*, *Luxury Listings NYC*, and *DESIGN*, among other magazines. She also has written two coffee table books for *The Monacelli Press*: *Designers Here and There* and *Designers Abroad*.

## Numbers Tell the Story



- The average telecommuter earns a higher median salary than an in-office worker.
- 100% telecommuting is the most preferred type of work flexibility among flexible-job seekers.

- 53% of women and 48% of men telecommute.
- It is predicted that 38% of full-time staff will be working remotely in the next decade.

- Benefits of remote work include increased worker productivity and efficiency, reduced employee turnover, and greater employee satisfaction.

- Top reasons for remote work include work-life balance, family, and commute stress.

Source: FlexJobs

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# IF YOU PRINT IT

First, there was a faucet. In 2016, DXV introduced a collection of 3-D printed faucets that made the design community stop and stare. They may not have been the first 3-D printed products the world had seen, but they were the ones that really started turning heads and they garnered a number of design awards in the process. Since then, we have seen everything from tables and chairs to actual homes come out of 3-D capabilities, and the technology seems to know no bounds. In the November/December issue, *i+D* will take a look at how this technology has changed the marketplace and just how much potential it might still hold. ●

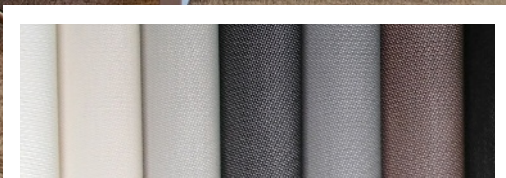
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