

Biomimicry: An Interview with David Oakey

Q: You have become a regular speaker on the subject of sustainable design. In the global ecosystem of industry and commerce, what is the ecosystem of interior design?

A: Man and nature have come apart and I think the closer we can start to connect with nature and be a “system” the better off we will be. There’s a lot we can learn from nature. Sustainable design, or as I call it, ‘respect for the environment’ leads my thinking process. I use this phrase to stimulate thinking about how our actions affect future generations. My realization of this concept began at a very young age when I was growing up in England, in the countryside often called the Midlands. My first contact with the carpet industry was in a small town called Kidderminster, which specialized in carpet design and manufacture. My father often retrieved the waste wool from the carpet manufacturers there, to lay as fertilizer on his fields. The colors were blue, pink and purple — it was the late 1950’s-60’s, a fun and colorful time.



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A few years later, I noticed that there was no array of colors in the fields and I asked my dad why he didn’t get the waste wool anymore. He explained to me that they had made changes to the carpet; ‘They added nylon to the wool and a chemical to kill the moths, so I can’t use it for fertilizer,’ he said.

Today, I realize that the designers and manufacturers made a terrible error. They neglected to think about how the changes they made to the 100% wool would affect the products after their use. As a designer of interior products, I must constantly be concerned about product life cycles, i.e. what happens after the ‘death’ of a product.

Q: Can we as humans change the world? Can we undo the damage humankind has inflicted on Mother Nature?

A: I am not a scientist, chemist, definitely not a biologist, but as a designer there’s a lot of common sense in a concept best described in Janine Benyus’ book, *Biomimicry, Innovation Inspired by Nature*. I have been greatly inspired by those principles.



To quote Benyus, “Biomimicry is the process of learning from and then emulating life’s genius. After 3.8 billion years, life knows what works and what lasts here on Earth. Mimicking these designs and strategies, ‘recipes’, could change the way we grow food, harvest solar energy, run our businesses, even the way we make materials.”

The U.S. military has looked to this concept in the development of bionics and steel composites for the stealth bomber, based on what they have learned from the composites of a rhino’s horn. Designs have been created for torpedoes that swim like tuna. The viper’s intelligence and sensory ability has also generated quite a bit of data for the development of heat seeking missiles.

Biomimicry is a science that studies nature's models and then imitates or takes inspiration from these designs and processes to solve human problems.

Q: Tell us how biomimicry fits within Interface's overall mission for sustainability.

A: The science of biomimicry provides us with a framework that we can use; a roadmap to sustainability that is complementary to the Seven Fronts and the Natural Step System Conditions. In Janine's book she talks about a set of rules, and I believe that if we can follow these, we can become sustainable. If we become sustainable, we'll find out that we followed the rules.

- Nature runs on sunlight
- Nature uses only the energy it needs
- Nature fits form to function
- Nature recycles everything
- Nature rewards cooperation
- Nature banks on diversity
- Nature demands local expertise
- Nature curbs excesses from within
- Nature taps the power of limits

Q: Do you believe that Interface or any other company can go it alone in its quest for sustainability? Can Interface be the only sustainable carpet company?

A: In an ecosystem it is the "system" that works. Biomimicry can represent business models. The rainforest is a sustainable system. All waste, each particle, is consumed by another species. Cooperation appears to be more important than competition.

Nature rewards cooperation

Cooperating with suppliers, customers and sometimes even competitors may be needed. It may not be that we can go it alone. In my own quest for more knowledge on the subject, I read two excellent books; *What We Learned in the Rainforest* by Tachi Kiuchi and William K. Shireman, and *Cats' Paws and Catapults* by Steven Vogel. These books helped me put this concept into better perspective. To understand how to create the right "system" you must first have a good understanding of the differences between nature's designs and human designs.



Q: What are the differences between nature's designs and human designs?

A: Nature's designs are organic. Their shapes depend upon their functions. They are not linear. They are not based on lines and are therefore not limited by them. In nature, designs are organic, they are very small (only as big as they need to be to fit the function). Human designs are very geometric and they are often larger than most natural inventions. Our inventions are very brittle, stiff and most of them depend on wheels for mobility.

Nature fits form to function

I start to think about this and it starts to take me out of the "box" to think differently. That's

where biomimicry is good for me. For our customers, we build in boxes and squares and rectangles. The square and rectangle are the most logical shapes that humans can think of (e.g. square tables, square bookshelves, square rooms, and carpet squares.) These shapes are ideal for utilizing space and to humans, flatness is perfection. Besides, the wheel works well on a flat surface. The negative is that the corner is a weak spot. The positive is the use of space.



“It’s an organic world when man tries to think of what it will look like in the future.”

In nature’s world, there’s no such thing as a square or rectangle. They’re hard to find because nature is organic. People are organic beings, yet furniture started off flat and square. I often question whether this was driven by aesthetics. In the past few years the industry has changed radically to fit form to function. Now suddenly, we are designing office furniture with organic, fluid and flexible qualities to fit our bodies. Properties of some of the newest ergonomic designs are similar to the design of nature — for instance chairs with moveable “limbs.” We were quicker to integrate organic design into architecture. Examples include the Crystal Palace in London, based on the design of a water lily and the Sydney Opera House in Australia, based on the shells of the sea. Computer aided technology has enabled designers to move toward these more organic shapes. It’s interesting if you think of Hollywood and you go back years and years when they portrayed the future. In scientific films and in shows like *The Jetsons*, there were no squares and blocks...it was all organic.



Q: Interface has made great strides with eliminating waste. How does this fit into the biomimicry principle?

A: This conversation often comes up when we have seminars focused on biomimicry. What will you do with the waste? Can you create an avenue for the waste? Janine Benyus tells us that waste should be a good thing. She says, “You actually want waste. You design a manufacturing process in which your waste is the profit center. You design your product around not just the product, but how you design the best waste. You design your product so that in its future life as waste, it’s valuable.” She says think about it this way: “Create as much waste as you want, but make sure it makes money. What you realize is that it wasn’t really waste at all, and the word ‘waste’ goes away.”

Q: How does a company like Interface adapt and use biomimicry?

A: At Interface, we’ve taken our people; the ones that make the carpet, to see what they can learn from the natural world. At first they were intimidated. What came out of it was some great “out of the box” thinking. They realized that the natural world is a pretty good design system, and we can learn an awful lot from it. Our “system” includes our people. To quote Janine Benyus again, “Shape is the relationship among parts. Teamwork is the relationship among people. If you put people in a good team, you give them ‘shape.’ A well-structured team takes its shape from its parts.” Janine often illustrates this by talking about water and the emergent and surprising properties that oxygen and hydrogen have when they are combined.

Nature rewards cooperation

Biomimicry is about the interconnection of relationships, and so is design. Organizations are made up of people. Products are made up of materials, Design is dependent upon aesthetics and the interior is comprised of products.

Four or five years ago my design team held their first workshop with Janine Benyus and her protégé, Dayna Baumeister. They introduced the concepts of biomimicry and challenged the design team to integrate the principles into design concepts for carpet tile.

We sent them outside to see what they could learn from nature and they resisted at first. They thought they were going to design flowers and leaves, but the goal was to find out what they could learn about the natural design system. What they came back with was “organized chaos”, characterized best by the word “entropy” and thus began the product line – Entropy™.

They realized that there is no perfect flower and there is no solid color; it’s just a diverse system. The goal then turned to designing a module the way nature designs, aesthetically, their modules. In nature, each module is slightly different in color and that was the whole challenge. It was a challenge for the designers to let go of the aesthetics and get our engineers’ assistance. How could you make it so that in one production run, the color and design would come out slightly different? Suddenly you were bringing designers and engineers together to make it happen, and you weren’t thinking about what it would look like.

When we actually created this product, all the advantages came later. We found out, by accident, that we could actually lay it randomly instead of in a monolithic fashion. We found out that it was easy to make repairs because the tile didn’t match exactly in relation to the other tiles, so it didn’t make any difference whether it looked slightly different.

Entropy has become the biggest selling product in the shortest period of time in Interface’s history.

Q: Why is Entropy™ so successful?

A: Entropy is so successful because it follows nature’s model. It banks on the benefit of randomness and diversity. The Entropy design concept is a significant transition towards zero waste in manufacturing and there is not attic stock.

Nature banks on diversity

The cost to repair damage to a single tile is minimal when compared to the costs to repair traditional carpet. Repairing traditional carpet requires calling in specially trained repair professionals. The randomness of Entropy allows for much more flexibility. For instance, if a tile in a hotel room is damaged, the housekeeping staff can replace it—not worrying about which way to lay it, and the room is ready again. It’s really that simple. When you build your model around a natural model, people get excited. I’m sure you’ve heard your mother say, “It’s nature’s way..”referring to the right way of doing something. I’m sure you’ve also heard her say “it’s only human...” That’s usually when she’s saying you’ve made a mistake. It’s not usually in reaction to a positive thing. That’s a key difference between nature and humans. Nature rewards mistakes and learns from them.

