

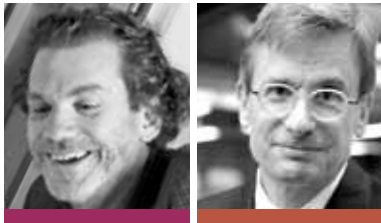


**David Edwards**  
talks with  
**Jeff Stein AIA**

With feet planted in the worlds of art and science, Harvard professor David Edwards is promoting new ways of catalyzing creativity and innovation.

# CATALYTIC CONVERTER

< Cloud Place (The Cloud Foundation);  
Boston. Photo by Joel Veak.  
v David Edwards (left) by Bruno Cogez.  
Jeff Stein AIA (right) by Liz Linder.



**David A. Edwards** is the Gordon McKay Professor of the Practice of Biomedical Engineering at Harvard University. In addition to his groundbreaking advances in the field of drug delivery and medical aerosols, he is the author of two novels, *Niche* (co-written with Jay Cantor) and *Whiff* (illustrated by manga artist Junko Murata), as well as *Artscience: Creativity in the Post-Google Generation*. He is the founder of Le Laboratoire in Paris ([www.laboratoire.org](http://www.laboratoire.org)), an innovative cultural center featuring collaborative art installations by artists and scientists, and with his wife Aurélie Edwards, he is the co-founder of the Cloud Foundation in Boston, which promotes art and creativity among urban youth ([www.cloudfoundation.org](http://www.cloudfoundation.org)).

**Jeff Stein AIA** is head of the School of Architecture and dean of the Boston Architectural College and is the architecture critic for *Banker & Trader*.

**Jeff Stein:** In his book *The Structure of Scientific Revolutions*, Thomas Kuhn notes that great scientific advances are intuitive. It's only after the initial stroke of intuition — that “Aha!” moment in which scientists are really only guessing at something — that the left hemisphere of the brain kicks in and the experimentation, which is what most people think of as science, takes over. You've invented the term “artsience” to describe a kind of creative thinking. Are these concepts related?

**David Edwards:** Yes, absolutely, although Kuhn's work focuses on very recognizable “Eureka!” moments in the history of science. Artsience suggests that the process is less linear. Great innovations often come from two kinds of responses to a problem. One is the process of intuition and induction, which requires comfort with uncertainty and is often image-driven. The other frames the problem by simplifying it to a set of conditions that are identifiable and solvable — the scientific process of making a hypothesis, looking at the data, and drawing conclusions, which are often not what we expected and so require a new hypothesis. The artistic method and the scientific method fuse in key moments of innovation. The moments that are most memorable are the ones when we're standing in front of a blank page saying, “I don't really know what to do.”

**Jeff Stein:** Your interests now seem to focus on the problem of that blank page and the idea that it often makes sense to cross the cultural divide between art and science and begin to fill in the blanks from the other perspective.

**David Edwards:** I increasingly look back at my childhood as a fount of information about everything I'm doing right now. If you look at how we learned as children, you realize that we were constantly moving from one environment, which we would get to know, to another, in which we had no clue. We went from crib to living room to school, constantly entering new environments and needing to throw away a lot of what was familiar in order to discover something new.

The hallmark of creative people is that they try to shock themselves. They try to go back to that state where they're throwing themselves into an unknown environment. I may be very familiar with the scientific environment, yet I find it

very catalytic to my creativity to immerse myself in the artistic environment. Then, once I get adapted, I run back to the scientific environment and shock myself, like jumping into cold water, and suddenly I'm much more sensitive to what it is to be a scientist, to what that lab means, to all these things that I just grow numb to after a while. So I run back and forth. I think creative people often tend to run across this conventional art/science divide.

**Jeff Stein:** You've even placed yourself in that kind of situation in your personal life, dividing your time between Paris and Boston.

**David Edwards:** That's absolutely true. It's easy to point to all of the challenges of our age, but one of the benefits of the world today is the ability to live simultaneously in two very different cultures; that is a kind of art/science divide for me.

**Jeff Stein:** You're also crossing divides in your professional life. You were trained as a chemical engineer and have taught at MIT and Penn State as well as Harvard. And now you are also jumping back and forth into the worlds of commerce and nonprofits.

**David Edwards:** The reality is that, from an early age, I was really never comfortable in an educational environment, even though I ended up being very educated. I was often very frustrated with school. That probably started at age eight when I wrote my first novel. My teacher took it home, and her son dropped an ice-cream cone on it. I constantly had the feeling that what mattered to me didn't really matter in my school. In the late '80s and early '90s, I moved to Israel for four years. I had this idea that I could just live another life, and ended up becoming a very theoretical scientist, really loving my work. And I wrote. I've always been interested in writing, but it was a very private kind of passion.

**Jeff Stein:** You kept a pretty low-profile until the late '90s when it seems that you had your own "Aha!" moment. What happened at that point?

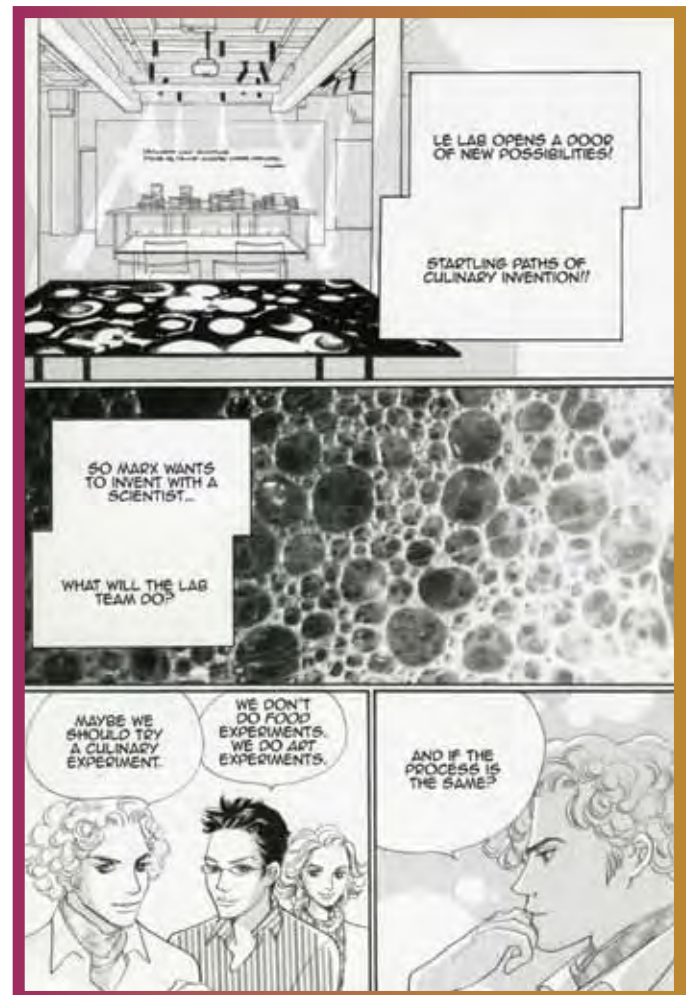
**David Edwards:** Something very surprising happened to me: I published an article in the *Journal of Science* about delivering drugs, such as insulin, to the lungs in special kinds of aerosols, after which a venture capitalist approached me. He wanted to bet on my idea. I was at Penn State at the moment; I had left MIT a couple of years before that. I had no experience in industry and was both flattered and then frightened by the prospect that if I wanted to follow that opportunity, I would have to leave the scientific research environment that I had grown accustomed to, my comfort zone. We founded a company, Advanced Inhalation Research, which was sold within a year; the condition of sale was that I had to stay on for two years.

After that three-year period, I came back to Harvard to teach. I had left the university thinking I knew everything that I needed to know, and was coming back feeling as if I'd discovered everything that really mattered while I was away. I thought hard about how I could bring that experience to my students, this different way of learning.

One important element was that somebody had made a bet on an idea that I had, that someone believed in it enough

to do that. And it pushed me, really pushed me to an edge, to take risks I never would have taken, just to prove my idea. So I started to teach a course where I encouraged kids to dream — I kind of bet on them.

This was during the Larry Summers years at Harvard — he was encouraging a lot of interdisciplinary dialogue on campus. I had started to write a novel more seriously, and my wife and I had started the Cloud Foundation to bring arts programs to urban kids. As I became more and more involved in the arts, I noticed that most of the university interdisciplinary dialogues were among the scientific disciplines; the humanities in general were not included. So I started a dialogue with a group of people, about 11 of us, from a music theorist to a composer to an architect to a medical doctor; people who, like me, rather than being driven away from this art/science divide at Harvard, were attracted to it for different reasons. All of us were very different, but we had similar experiences in that we were all celebrated by our institutions, but none of us had really been nourished by them. And we had all fled our institutions at key moments in our creative process. I suddenly understood why I had been doing so many different, weird things in my life, and what the writing had actually represented for me. The outcome of this reflection was a book, *Artscience*, and the idea of Le Laboratoire, an experimental center promoting arts/science collaborations.





< This page: *Le Laboratoire*; Paris. Photo by Bruno Cogez. Left page: Manga art by Junko Murata; excerpted from *Whiff* © 2008 by David Edwards; published by Éditions Le Laboratoire (distributed in the US by Harvard University Press).

into phases: a starter or conception mode, a translation mode, where we're developing an idea, and a realization mode. We gravitate toward the environments that support those phases.

**Jeff Stein:** In other words, we are possessed of brain, voice, and hands, and we're working with one of them at a time, but all three of them together get us where we want to be.

**Jeff Stein:** So you became *homo faber*, he who makes, not just he who thinks. And as a result, your title is not professor of biomedical engineering, but rather professor of the practice of biomedical engineering.

**David Edwards:** It's ironic, because, 15 years ago, I was a very theoretical scientist. I have since learned that discovery is an active process. It's an active confrontation with a mysterious, evolving, unimaginable world.

**Jeff Stein:** There has been a lot of talk lately about the sorts of people and the kinds of activities that make up the Creative Economy — which at some basic level is about this process of discovery and the translation of ideas to some useful purpose: products, jobs, positive change.

**David Edwards:** We're seeing an incredible rediscovery of the power of human creativity, and the possibility to transform our world in potentially beneficial ways. The challenge is how to integrate that into institutions, particularly into educational institutions. How do we teach that? The Creative Economy is a huge reality here in Boston, one that doesn't exist in such a dynamic way in many other places in the world. Our challenge, right now, is how to grow that.

**Jeff Stein:** As you've thought about the creative process, have you found any commonalities that suggest that there is a teachable formula? Is there, for example, an identifiable moment when you switch brain hemispheres or when the artistic trumps the scientific?

**David Edwards:** I'm really skeptical of the "how to" approach to being creative; all the really creative people I know have never followed that sort of path and probably would not even want to analyze their creativity. But here's one observation: I think that creative people are very sensitive to their dependence on environment, both the human, or architectural, environment and the intellectual, or creative, environment. So they tend to put themselves in stimulating environments. Creativity seems to fall

**David Edwards:** Yes — that's an interesting way to put it. One problem in our understanding of creativity is that our social and cultural institutions are mostly designed to measure and encourage manifestations of ideas, which often substitute for creativity itself. When a book is published, or a product is manufactured, or a symphony is performed, the key moments of the creative process are invisible. In the course of a creative endeavor, you're going to make lots of mistakes. But creators don't see them as such — they're producing prototypes, so of course there are mistakes; you learn through multiple iterations. That may go on for days, weeks, months, even longer. But that's when everything's happening; those are the key moments. So I think for the creative process to be really alive and active, as it is in a healthy childhood, we need to be frequently thrown into that mode where everything is evolving, where we don't know where to go next.

**Jeff Stein:** And that mode is often found in an artistic environment. So, the creative mind can be developed through exposure to the arts, and yet the arts aren't as valued politically here as in France, where you spend the other half of your life. Can we change that?

**David Edwards:** There is a need today to demonstrate the value of the arts in America, beyond the ability to sell a work of art to a major museum. The arts are hugely relevant to culture, to humanitarian engagement, and to industry, and there's a need to integrate the arts into all that we do. The Cloud Foundation is an effort to advance that idea by working with the Boston public schools. My wife and I did not grow up with money. Selling the company was very exciting, of course, but it was also disorienting — not in a negative way, but just in trying to understand it. We made a decision right away that we wanted to give away at least half of what we made, and we wanted not to just write checks but to be actively challenged by the process. So we created the Cloud Foundation, which has since worked with thousands of kids through its headquarters at Cloud Place on Boylston Street in Boston.

The Foundation has recently entered into an exciting new

phase with the recent launch of our first ArtScience Innovation Prize competition for Boston public high school students. Its purpose is to help them develop the tools for cross-disciplinary learning and creative thinking. We provide them with up to 100 breakthrough ideas, very “blue sky” art and design ideas at the cutting edge of science. They then work with mentors — scientists, artists, and entrepreneurs — and participate in workshops at Cloud Place and the Idea Translation Lab at Harvard to help them think about how to translate these ideas into project concepts, which could be new products, for-profit companies, museum exhibitions, nonprofit organizations, anything. Teams will present their ideas to a panel of judges this fall, and the winning team will receive \$100,000 and a trip to Paris to continue its work at Le Laboratoire. The goal here is to bet on kids, to get them to learn early on that their passionate commitment to ideas that cross boundaries can be transformative.

**Jeff Stein:** Besides the Innovation Prize, what goes on at the Cloud Foundation on a daily basis?

**David Edwards:** We talk to 10,000 kids a year but work principally with the hundreds of kids who come in for after-school art workshops and programs. We sponsor exhibitions and events and work in partnerships with other organizations in the city. In general, Cloud Place is a kid place where kids are the curators. Working

with kids means dealing with problems of kids, so there are lots of sit-down conversations and moments with kids from struggling neighborhoods in Mattapan and Lynn in which you sometimes hear things that are very powerful and sometimes difficult or hurtful. The Cloud is a window into the life of our young generation.

**Jeff Stein:** You have a sister organization, Le Laboratoire, in Paris, which is more for adults and sponsors projects between artists and scientists.

**David Edwards:** The Lab, as I call it, is a cultural institution in the center of Paris that is closely partnered with Cloud, Harvard University and, increasingly, Trinity College in Dublin. It includes exhibition space and a design prototype store, where you can buy things that you can't buy elsewhere. As prototypes, they may not work perfectly. There's also a food lab, a wild place where we're producing food innovations with the renowned chef Thierry Marx, who we think of as a kind of culinary artist. Our challenge is to invite the public into art as process, as opposed to art as outcome, which is the fundamental distinction of a cultural lab versus a cultural museum. We do a few experiments each year with major artists and scientists. The idea is to create a new kind of translational lab, in this case a cultural lab, which is creating value that we can measure. We're doing an experiment at the Louvre right now. I'm hopeful that the Lab will invite major investment from both government and venture capitalists.



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**Jeff Stein:** Your new novel *Whiff* is a fictional account of an actual process that led to a new product from the Lab just last spring.

**David Edwards:** Yes. The product is Le Whif, an aerosol inhaler that delivers the taste of chocolate, without actually eating the chocolate. Zero calories. The novel was written with the idea of engaging the public in the drama of the creative process, which is hard to convey in an exhibition space. The food lab led to thinking about art and food and science, which led to the idea that maybe you could inhale food — I do know a lot about aerosols. I gave the idea to some students and they inhaled substances like mint and pepper — although the pepper was a disaster. At the end of the semester they said, “This is really cool, but we can’t stop coughing.” So we figured out how to get around that, and then included a Nespresso Whiff Bar in a culinary art exhibition at the Lab. It made a lot of news — people were enchanted by the idea even though many coughed. So we improved the design and now finally have a commercial product. We planned to sell it in our LaboShop and at Colette, a high-end store in Paris, and on the Internet. But then a young, former student, who is a brilliant entrepreneur, decided to start a viral campaign. That was a Friday in early April. By Saturday, our Internet traffic had doubled. Two weeks later, we were being asked for interviews on *Oprah* and *Good Morning America* and weeks later we’d received inquiries from distributors in 40 countries around the world.

**Jeff Stein:** You’re describing creativity as a constant state of metamorphosis.

**David Edwards:** Or to turn that thought around, it is at the frontier of knowledge where we all become artists. Metamorphosis is confusing, chaotic; a scientist at a frontier of knowledge is not sure of anything. Take Judah Folkman, a man I really admired, a pioneer in the field of angiogenesis in cancer research, which focuses on blood supply to tumors. For years and years, he stood at a frontier with no proof that this frontier was really what he thought it was.

**Jeff Stein:** With your novels and products and teaching and the Cloud Foundation and the Lab in Paris, you’re really kind of a bridge builder. The Japanese have a term for this: *hashi*. It means the end of one thing and the beginning of another. And that can be a bridge. It could be chopsticks, which is the end of food on the plate and the beginning of food in your mouth.

**David Edwards:** I love that concept; it’s another way of thinking about metamorphosis. Our civilization is undergoing a metamorphosis right now, and at the same time I think that we all feel pulled toward this frontier of knowledge. It’s a very chaotic, confusing era. But this is precisely the time in which the arts have a major role to play in every sector of society. The arts can teach us how to embrace the chaos and turn it into a moment of enormous creativity. ■

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