

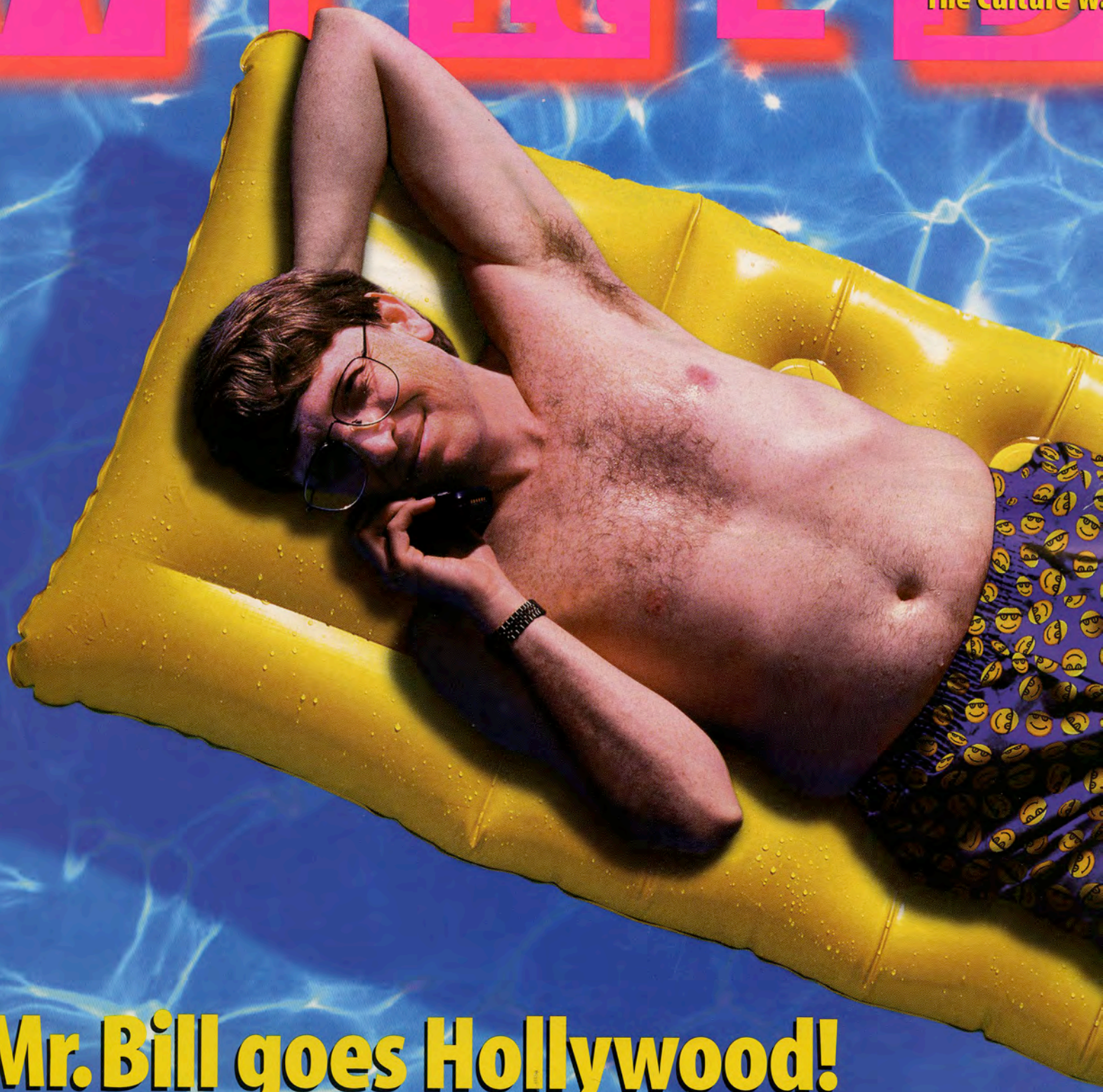
WIRED

Avatars are Next

Jhane Barnes, Fashion Nerd

June 1996

The Culture We



Mr. Bill goes Hollywood!

Microsoft morphs into a media company

by Denise Caruso Special Gatesfold Issue ▶

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Self-portrait designed by Jhane Barnes

Unlike Calvin, Donna, and Giorgio, Jhane Barnes is a genuine techno wonk, adept at using technology to design her luxuriously tactile clothing, fabrics, and furniture.

By Michael Sand

fashion nerd

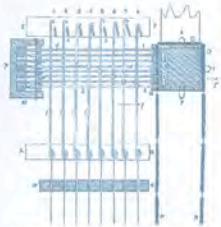
Charles Babbage was onto something when he established the computer-loom connection. Never mind that he died frustrated and a victim of persecution by street musicians – Babbage had a prescient insight in the 1830s when he invented the Analytical Engine. This machine, conceived but never built, is generally considered the first modern computer, complete with input and output devices, memory storage, and a kind of processor. The design called for more than 50,000 moving parts, which operated according to the principle of the Jacquard loom.

While computers (and operating systems) have been reinvented countless times since Babbage's day, basic loom technology, including Jacquard's, has changed relatively little. Picture a large wood-frame box, like an oversize piano with its interior exposed to view. The piano strings parallel the lengthwise section of the loom's weave, known as the warp. The crossweave, or weft, is carried across the warp by a shuttle – a cigar-shaped vessel that leaves a trail of weft thread in its wake. Sit down at the keyboard, start playing, and instead of producing music, the box generates fabric.

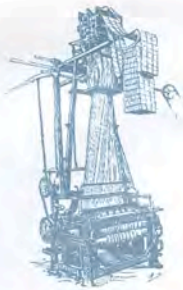
What Joseph-Marie Jacquard did was turn the conventional loom into a player piano, allowing it to operate semiautomatically by means of punch cards, much like the ones used to feed data into mainframe computers in the 1950s. Following the configuration of holes, the piano knows what notes to hit when cranking out a tune or, in the case of the Jacquard loom, a piece of woven cloth.



Fig. 3, cartons.



Métier Jacquard : Fig. 1, mécanisme.



Métier Jacquard.

Early computers as imagined by Charles Babbage (see inset, right) were inspired by the Jacquard loom (above). Today, menswear maven Jhane Barnes takes up the threads of this historical link in designing signature fabrics like Isometry, shown at right.

It has been more than 160 years since Babbage thought to apply loom technology to his calculating machine, but computers and textile design are again converging. Today, new software can generate patterns automatically, translate designs into instructions for weaving, and even simulate the look of fabric. Few of the top designers have figured out how to use the technology effectively, but menswear innovator Jhane Barnes, whose use of Jacquard looms has yielded some of the most complex textiles around, is helping set the pace of this transformation.

Using customized programs, some based on fractal geometry, Barnes conceives her patterns on a Power Mac 9500/132. She then outputs them to one of four printers, a small-scale sample loom down the hall from her office, or as a series of instructions for a Jacquard. Her process argues compellingly for the cyclical model of history and technological innovation: the inventions of one age (mechanical-industrial) gradually give rise to those of another (electronic-informational), which in turn drive the antiquated contraptions that started the cycle to begin with. Where Babbage took his inspiration from the palpable world of textile production and reinterpreted it for the theoretical realm of mathematics, Barnes conceives patterns from an invisible cluster of computations and coaxes them out into luxuriously tactile material.

The look of wool, the feel of glass

Jhane (pronounced "Jane") Barnes moves about excitedly as she tells me about the programs she's been using to design fabrics. One sample appears on a screen behind her. (We are in the 14th-floor midtown Manhattan studios of Jhane Barnes Inc., which overlook the New York Public Library.) Her dark gray-brown suit has fine, lightly colored Jhane Barnes lines darting up and down the fabric, complementing the maroon-and-gray geometrical forms on the Jhane Barnes-upholstered office chair on which she's perched. Barnes is 42 and fair-skinned, with strawberry-blond hair cut in a pageboy that springs slightly as she turns in her chair. A few sheets of one-inch-wide fabric swatches in muted grays, blues, and greens sit on her desk. Printouts of fabric designs – bright plaids that overlay background patterns based on fractals and natural forms – are strewn across the floor to her right.

Early in our conversation, Barnes turns to engage with the computer. A huge monitor displays a series of triangles framed within an interface that offers an impressive array of design tools. I'm not quite sure where to focus. Late-afternoon sunlight streams in through a wall

of windows, throwing a hazy white glare on the screen. Barnes starts pointing energetically at the monitor.

"These are the grids that control the weave," she says, pressing her index finger against the screen to show me patterns unfolding. "And these are the schemes that Bill wrote – each scheme is a series of algorithms that generates patterns." A cloud of milky fingerprints covers the glass. From pixels to printouts to cloth: this woman, I think to myself, seriously needs touchscreen technology.

The "Bill" she refers to is Bill Jones, an applied mathematician Barnes has been collaborating with since 1993. Jones and computer scientist Dana Cartwright, who together spent 23 years directing computing at Syracuse University, now design the software that lets Barnes experiment with a seemingly infinite array of patterns and, then, ultimately output them as fabrics on a loom.

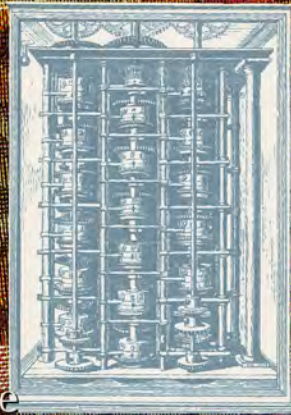
The inventions of one age

Their company, Design Software Inc., has flourished in the last three years. One of their most innovative programs is WeaveMaker, an expert system application that has integrated the advice of a team of textile designers to generate new patterns and color schemes automatically while adhering to the discipline of warp and weft. WeaveMaker has most of the standard design functions built in, plus a "Cornucopia Tool" for those times creative ideas don't flow. Click on it and the program will pour out thousands of designs, one after another, until you tell it to stop.

Barnes discovered WeaveMaker at the Convergence trade conference in 1992, where she was keynote speaker. "Very few people purchased the software," Cartwright says. "Most people just don't get how a computer can help a designer. Jhane got it instantly." Barnes took the program back to her studio and immediately put it to use.

WeaveMaker lets Barnes produce complex patterns on the dobbie loom, a more affordable device than the highly refined Jacquard. Three small-scale dobbies sit in the back of her studio. If the loom has been threaded properly, she can send a pattern from her office over the internal network, and her assistant designer will call it up on screen. The system then instructs an air compressor to activate the loom, generating a small, exquisite fabric sample in about an hour. It's a peculiar sight – the miniature loom, the apprentice weaver, and the computer that interpolates Barnes's concept and sets it into fabric via the most elemental channel imaginable: Air.

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of another, which in turn drive the
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Software junkie

The computer is an essential designer's tool today, says Ingrid Johnson, chair of the Textile Development and Marketing Department at New York's Fashion Institute of Technology. But Barnes's computerized studio, she adds, "is still the exception, though it won't be for long."

Jack Lenor Larsen, an eminent textile designer who sits on the board of the American Craft Council, agrees. "New technology is totally revolutionizing the textiles industry," though, he adds, "it is affecting design less than production at this point." New software and loom refinements mean cheaper, faster, and more streamlined manufacturing. They also mean that more can be produced domestically, at greater savings. "People will take greater risks as a result," Larsen says.

But few have fully embraced the computer like Jhane Barnes. Among those actually designing clothes with the new tools, many are just using off-the-shelf software like Photoshop to create prints – for items like ties, whose patterns are printed on top of the fabric rather than woven in – which is the simplest, most common type of computer-aided design.

The big names have been particularly slow to get started. "Acceptance of CAD has not followed from the big houses down to the small, but as usual from the vast middle to either end of the spectrum," says Alison Grudier, a Boston-based consultant who helps fashion companies go digital. Grudier can count the top-level houses on one hand. "Liz Claiborne had some CAD stations for a number of years, but it really wasn't until last year that it made the big push into getting wired. Calvin Klein, who has had a system or two for a number of years, has finally put some effort behind it." Designers at Chaps Ralph Lauren have been quicker on the uptake, using CAD for the past six years, according to William Forrester, the company's director of computer systems. I stopped in at Donna Karan's New York offices to find half a dozen SGI Indigo workstations being employed to design the DKMen Web site and virtual showroom. But Karan hasn't yet expressed any interest in using the machines for design.

While many of the established houses are just beginning to play around with design software (as a spokesperson for leading designer Isaac Mizrahi put it, "The only thing we use the computer for around here is word processing"), Barnes has been integrating the computer into her process for a decade and has even helped programmers modify commercial software packages to suit a designer's needs. According to Renée Chase, head of the fashion program at Drexel University and author of *CAD*

for Fashion Design, "The industry is using CAD for tracking, presentations, recoloring, finding new levels of control in production. But using it as a creative tool – Jhane is the only one really doing that."

Working with her partner and master tailor Erasmo ("Eddie") Di Russo, Barnes uses a simple CAD program called Canvas for garment design and tailoring. ("I would never use a pencil anymore," she says. "You have to erase.") The software allows the duo to store hundreds of colors and basic silhouettes for shirts, jackets, and pants, then to retailor them each season to suit their whims.

With the programs MandelMovie and FractaSketch, Barnes has created a line of clothing patterned on the idea of similarity of form down to the smallest level – the basic concept behind fractal geometry. Using Mandel-

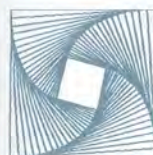
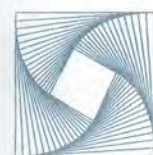
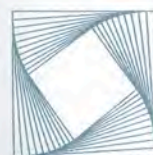
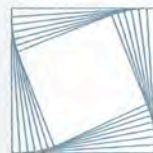
"The industry is using CAD ...

Movie, she has designed fabric for shirts and sweaters based on Benoit Mandelbrot's famous blood-drop-like icon of fractal geometry, and has even explored the outer edges of the Mandelbrot set, where the spiraling psychedelic coils that most people associate with fractals reside. With FractaSketch, she has created patterns based on linear fractals and has contrived designs from the Koch snowflake (a geometrical form of infinitely complex borders) and the Sierpinsky triangle (an equilateral triangle continually subdivided into smaller triangles).

She has also developed dozens of patterns based on the principle of symmetry using Symmetry Studio, a software package developed by Timothy Binkley, chair of the graduate program in computer art at the School of Visual Arts in New York. Binkley first met Barnes at a multimedia presentation on fashion and mathematics that she gave in 1994. "I was really inspired by her," says Binkley, a self-described philosopher, mathematician, programmer, and artist. "In the beginning, Jhane saw the computer as a shortcut. But as she got into it, she started actually designing in a new way." With Binkley's program, Barnes can take any pattern and run it through repeats using the 26 types of symmetry known to exist in the universe. Binkley's at work on version 2.0, which will feature a Jhane Barnes pattern on the package.

What a little *h* can do

The year 1996 marks Jhane Barnes's 20th year in the fashion business. Two decades have brought prestigious awards and astonishing growth for her independent company, Jhane Barnes Inc., which she started on a single ▶



With a program called *Symmetry Studio*, Barnes (in her office, right) can run a pattern through repeats using the universe's 26 known types of symmetry (as in the example above). Barnes's atelier features old-fashioned looms, too.



But using it as a creative tool?
Jhane is the only one
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commission while a student at FIT. Celebrities who have recently been spotted in Jhane Barnes clothing form an impressive (if unlikely) fashion set that includes Bill Clinton, Boris Yeltsin, Wynton Marsalis, Rudolph Giuliani, and The Temptations. Although menswear remains her primary passion, Barnes also licenses out her fabrics through the Knoll Group, designs furniture for the Bernhardt Furniture Company, and is a design consultant for a new Disney-backed Broadway production of *Aida* planned for sometime in 1997.

Barnes grew up in Maryland as simply "Jane." She was discouraged by a high school teacher from going into science ("You'll just be average," he told her, "and there's nothing worse in life than to be average") and then didn't make the cut as lead percussionist in the school band. She decided she would design uniforms for her fellow musicians.

"Our band wasn't only for nerds," she says, "even though I was one. I took over the practice room and turned it into a little factory.

At the Fashion Institute of Technology, Barnes mused: "I was supposed to go to Caltech to study astrophysics. What am I doing here?"

I made 15 or 20 uniforms in a few weeks and got money from the principal."

She went on to study at FIT, the whole time experiencing a nagging feeling that she should be doing something else. "I was supposed to go to Caltech to study astrophysics and thought at the time, 'What am I doing here?'" But when a retail executive noticed a pair of her trousers on a model while dining in a Manhattan restaurant, he asked Barnes if she could produce 1,000 of them, and with a loan from her biology professor, she was suddenly in business. It was after this first commission that Barnes decided to add the mysterious *h* to her name. "When I started my company," she says, "the whole concept of a woman designing men's fashion was very alien. After I inserted the *h* in my name, some people thought I was a man and many thought I was from Europe."

In the beginning, Barnes garnered attention for her unusual approach to tailoring – jackets with no lapels, sweaters that didn't gather at the waist, one piece sleeves. But

even in the wide-lapels-and-flared-pants days of the mid-1970s, most men were reluctant to wear her far-out designs. Barnes realized she would do better to follow more traditional silhouettes, and to experiment in her use of texture, color, and weave – the features for which she is now best known.

Despite a brief foray into women's clothing design, she has stayed with menswear, which, Barnes says, allows her more freedom. With women's fashion, "it's very much about following trends and keeping up. And with my menswear, I don't follow any trends. Guys tend to collect what I do and keep it for many years. I thought I could build that interest in women's fashion, too," she confesses, "but I tried and I failed. The stores wanted me to follow what everyone else was doing."

These choices, however, seem only to have worked to her benefit. "Jhane has carved out her own niche in the market," says Kevin Stewart, fashion director of *Details* magazine. "And she's been at it for a long time – before Donna Karan and many of the others."

According to Stewart, Barnes's weaves are what make her work stand out. "Her customers are looking for a lot of graphics. Not plain or traditional stuff."

Sweaters, sofas, walls

These days, clothing is only a part of Jhane Barnes's output. Roughly 15 percent of her US\$80 million-a-year business is done through the Knoll Group, one of the world's leading office furnishers. Together, Knoll and Barnes provide the inside look and feel of much of corporate America. According to Howard Feinberg, Barnes's partner for more than 14 years, her fabrics grace the interiors of IBM, Hewlett-Packard, Compaq, Sony Entertainment, Viacom, and Apple Computer, as well as The Quaker Oats Company, The Walt Disney Company, Turner Broadcasting, Coca-Cola, and the American Medical Association. "In many cases, such as at Apple Computer," says Feinberg, "the interior design and facilities group was already familiar with Jhane, since many of them wear her clothes."

Barnes's Knoll textiles, which echo patterns she designs for clothing, often end up covering coordinated Knoll office chairs and work areas. They also cover sofas and walls. Her 57th Street showroom, just across from Carnegie Hall, is itself a showpiece of Jhane Barnes-Knoll design. The place has the retro-futuristic look of the Jetsons' living room – shimmery silver doors with frosted glass windows, industrial partitions held up by floor-to-ceiling metal risers, a textured wall covering with squiggly lines and invisible seams. Barnes's wall coverings often contain strange particles that add texture. One version manufactured in Japan contains reconstituted toothpick shavings, an ecologically hip use of by-products from the thriving Japanese toothpick industry.

Tom Job, vice president of sales for Knoll, says the fact that Barnes designs digitally is a selling point for those who want to take an interior and "tweak it up," but admits that her patterns are not for everyone. "It's almost a love-hate thing for many people," he says. "Some clients are more conservative; they're looking for Arts and Crafts or William Morris."

Working on the computer allows Barnes to consider input from her clients. With the help of design software and in-house weavers, she can modify her color schemes and produce new samples almost instantaneously. Ordinarily, it could take weeks for a designer to weave what Job refers to as a "colorway" (a particular combination, such as navy-green-black) into new samples at a mill.

This aspect of the textile business is likely to change dramatically with the development of new fabric-simulation programs. David Kramlich, a researcher at Face Software Inc. in New York, works on simulation for Viable Systems Inc., makers of top-end computer systems for Jacquard looms. He says that combining sophisticated fabric-simulation techniques with 3-D modeling is too computationally intensive to be practical on most systems. They're getting close in animation, he says, but without much fine detail. The lifelike but wooden-looking characters in *Toy Story* suggest the limitations Kramlich alludes to (which isn't to say that the fabrics on the living-room furniture weren't some of the most realistic elements of the film).

Dana Cartwright faces a similar problem with his software. "Right now I'm working on how to make the simulated fabric look wrin-

kled, since all 'real' fabric is slightly wrinkled. Our simulated fabric looks a little too perfect."

"In many cases, woven samples are essential," says William Maurer, vice president of Viable Systems. For instance, what do you do if you want to test the "wear characteristics" of a piece of cloth – the way that different weaves stretch, resist, or snag? Artificial intelligence will allow simulation programs to take care of this someday too, according to Maurer, but for now, it's still done by putting the sample through the mill, so to speak.

Barnes agrees that simulation will play a part in the future of fashion, but she's more interested in wringing out the genius in technology that's already arrived. Simulation systems are mostly used for copying existing fabrics, not creating new ones, she says. Since her designs emerge from the interaction between the computer and her imagination, there is no "original" to simulate. For presentations, she prefers to give her salespeople

decided to draw on her interest in Japanese design, fueled in part by her husband, Katsu Kawasaki, whose family owns the mills in Japan that produce many of her fabrics. The pieces were appropriately named: the Otera table, the Tatami lounge sofa, the Kasane chair, and the Wabi lounge chair. They've all got a keen sense of balance, simplicity of form, fine materials, and an elegant solidity. The table can add a touch of class to your dining room – and it could probably support an ox.

At first, the mathematically inclined designer wanted to create furniture based on fractals – a proposal that was quickly vetoed by Bernhardt as too impractical. Nevertheless, Barnes is planning future pieces based on mathematical toys. One idea she has played with is to make a coffee table (or at least the base of one) modeled on the Sierpinsky sponge, a cube with successive centers removed until pretty soon there are more holes than substance. The challenge would be to see how many centers could

However, Barnes has lost her share of clients along the way, either because she became too big in the eyes of certain specialty stores that have accused her of selling out, or because she didn't like the way one or two of the department store chains operated. She has entered into a number of licensing agreements, but insists on completing all the designs herself and overseeing all aspects of production whenever her name is attached to a garment or fabric marketed through another company.

A formidable businesswoman, Barnes has bought out a number of financial partners along the way. "I can't even remember some of their names," she tells me, adding, sheepishly, "I can remember everything I've ever made, though." She has also terminated licenses she wasn't happy with at the drop of a double-woven fractal-patterned shirt. "The ones I didn't like, I've gotten rid of. I usually don't seek a license; they call me. These are the ones that ultimately work out."

Clearly, her single-mindedness isn't hurting any. After the buyers from Neimans leave her office, Barnes and I walk back to the conference room, where piles of sweaters are strewn across the table. I offer to take one for a test run, just to see what all the fuss is about. "Oh, you don't want to wear that one," says Barnes, insisting it's a reject. "The fabric is too coarse." I look into the undersea blue-gray and yellow-flecked background of the sweater, and the black lines of wool, thick as caterpillars, that crisscross it in a weblike network. Too coarse? Nah.

The next day I wear the sweater; almost everybody I encounter feels compelled to touch me or to comment on the peculiar allure of the fabric. I look like the World Wide Web, someone jokes, or maybe I look like a lizardman. "I see you're wearing the stained-glass look," one friend tells me. "It reminds me of a forest, with leaves on the trees branching out," says my girlfriend's sister, little suspecting that she has just described the basis of fractal geometry.

That's why Barnes's digital clothing design works. All that math, all that programming, disappears into a woven synthesis of multi-colored threads. Nobody suspects for an instant that the sweater on my back started life as an illuminated array of pixels on a computer screen. ■ ■ ■

Someday, artificial intelligence will allow simulation programs to test the way a certain weave stretches, resists, or snags.

an actual fabric swatch to take home.

Meanwhile, there is a paradox built into using even today's digital tools: since it's easier and faster to explore multiple variations on a theme, people will get used to exercising those options. This approach challenges the idea that an artist's or designer's concept is inviolable. It's like eliminating the woodwinds from a Beethoven symphony because you only want to hear the strings. But Barnes has chosen to surf the tidal wave of new technology nevertheless and has adopted a more fluid and collaborative sense of textile design in the process.

Barnes's chameleonlike ability to adapt to new roles has led to some unexpected excursions – like the line of furniture she designed for Bernhardt Furniture in 1995. She bought Design Workshop, an inexpensive 3-D program; MiniCad; and Blueprint, MiniCad's 2-D program. Following Bernhardt's suggestion to conceive furniture she'd want to have in her own home, she

be removed before the thing collapsed.

Although the table was scrapped as too far-out a concept, or at least one that could not practically be built, Barnes insists that she has something else up her sleeve. Personally, I'm holding out for an ottoman based on the Rubik's Cube.

The payoff

As a woman designing menswear for the past 20 years, Barnes has maintained a fierce independence. On the whole it has served her well. The day I first visit her office, buyers from Neiman-Marcus, which spends \$4 million on Jhane Barnes merchandise annually, are in the conference room looking over her 1996 Transition line. (Transition is a fifth season – between summer and fall – that most of us outside of the fashion industry don't know about, even though we provide the market for it.) They seem to eat up her new designs: soon after the meeting they make a commitment to buy the entire season's line.