

# PURPOSE BUILT

*Brownsville's Penguin Cycles  
makes custom bikes with two things  
in mind: the rider and the terrain.*

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By KIRK KARDASHIAN

Photography by JUSTIN CASH



The Upper Valley abounds with heavenly cycling terrain. You want a nice, flat, scenic ride? Try Route 5 along the Connecticut River in Vermont, and then cross over a covered bridge to Routes 10 or 12A in New Hampshire. Looking for challenging hills? No problem; they're practically everywhere, from the leg-busting grades of King Hill in Etna, N.H., to the sinewy slopes of the Chelsea Mountain Road between Chelsea and East Randolph, Vt. If dirt roads are more your style, you're in luck: two-thirds of the roads in Vermont are unpaved, and they offer a world removed from narrow shoulders and traffic. Are you a fat-tire fan? The Upper Valley's got you covered there, too, with technical single track mountain bike trails in West Windsor and Reading, Vt., and smooth double track trails at Dartmouth's Oak Hill cross country skiing center in Hanover, N.H.

And if you've resolved to sample more of this terrain, it's a good idea to have the proper bike for the task. Sure, you can pick a nice bike off the rack in a bike shop, but if you're ready for something more

customized to your riding style and biomechanics, Penguin Cycles in Brownsville, Vt., can help. Located in an old cheese factory building at the foot of Mount Ascutney, which doubles as the home of Eric Kritivzky and Raina White, Penguin Cycles creates steel frame bikes that ride as nicely as they look.

#### ENGINEERED DESTINY

Eric, 29, and Raina, 30, met at Cornell University about 10 years ago, where they both were majoring in mechanical engineering. Eric — a tall, slender guy with a calm demeanor — didn't have to go far to get there, since he grew up in Ithaca, N.Y. Raina — an athletic woman with brown hair who is equal parts easygoing and direct — is originally from Ridgway, Penn. At Cornell they cultivated their interest in systems engineering, which is the study of tweaking complex parts so they work together as efficiently and effectively as possible. Eric describes it as "optimizing group performance to get to a goal."

Raina graduated in 2001 and then got her mas-

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(Above) Eric Kritivzky, owner of Penguin Cycles in Brownsville, Vt., by the frame jig he uses in his workshop.

(Left) A custom built 650B (27.5 inch wheel) Penguin mountain bike that was put to the test in the 2009 Vermont 50 Mountain Bike Race

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ter's degree in systems engineering before moving to the outskirts of Hartford, Conn., for a job. Eric graduated in 2002 and received his master's degree in aerospace engineering in 2003, joining Raina in Connecticut shortly thereafter. "I made him follow me," she says with a laugh. In 2005, Eric landed a job at Concepts NREC, a turbo machinery engineering firm in Wilder, Vt., and they moved to a building that used to house a cheese factory — a big, green salt-box structure along Route 44 — that year.

Raina left the engineering business to become a certified personal trainer — she has eight spinning bikes next to the Penguin Cycles workshop and offers classes and one-on-one training. She says that it's not a far cry from mechanical engineering: "The human body is the greatest machine ever designed," she says. She applies her understanding of mechanical and systems engineering to the biomechanics of the body, studying how the muscles, bones and ligaments work together, and how imbalances among them can cause injuries. With these backgrounds, it's easy to understand why they got into bike building, an endeavor that's all about two machines — the body and the bike — paired for

optimal performance and comfort.

#### **A LABOR OF LOVE**

Plenty of engineers like to ride bikes, but most wouldn't know how to build one. That's because the average college engineering programs are academic and abstract; they don't prepare students to actually construct anything. Eric and Raina got around that by joining a program at Cornell where they fabricated a small-scale race car, designing it from the ground up. That experience gave them the knowledge to weld machine parts. As they've always been avid cyclists, it didn't take long for Eric to have the idea to try building a bike.

"He's the kind of person who looks at something and says, 'I can make that,'" says Raina. Since the first bike they sold — to a guy who is 6 feet 6 inches tall and could never find something that fit him — Eric has taken bike building classes and honed his technique.

They've also developed a separation of labor: Raina takes the orders and helps with the fitting, and Eric does the building. Since 1996, they've built about 20 frames, and don't plan to make more than a dozen per year. They want to keep a high level of personal attention and not turn their cheese factory into a bike factory.

#### **GETTING IT RIGHT**

The journey to a custom Penguin Cycles bike begins with a long interview between the rider and Eric and Raina. They talk about the customer's riding preferences (duration of rides and terrain), bike preferences (stiffness versus comfort), and budget (light frames can cost more than heavier ones). Then they run the customer through a battery of measurements and tests. They measure things like height, sternum height, femur length, arm length, shoulder width and even shoe size: each plays a role in comfort, handling and efficiency on the bicycle.

Raina also performs a flexibility test to determine how much leg extension the customer can handle. Sometimes the customer will ride their own bike in a stationary setting so Eric and Raina can get a feel for the person's pedaling style. You can do many of these things through an in-depth questionnaire, or you can visit the shop in person and get a one- to two-hour consultation.

Once the customer's measurements and preferences are fleshed out, Eric designs the frame. He picks the diameter of tubing — according to the rider's weight and budget — and can help you decide on

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Raina White and Eric Kritivzky stand near a Penguin Cycle in progress.





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the components. Depending on your aesthetics and needs, you can choose to have the cables routed inside the tubes, and you can ask for braze-ons (permanently attached parts) for bike racks and fenders. When the details are set, Eric goes to the computer, where he uses a bike-specific design package to depict all the angles and lengths of the frame. Before any tubing is cut, Eric shows all this information to the customer to make sure he or she is on board with the geometry.

With the specifications finalized, Eric creates a packet with all the dimensions and jig measurements, and then begins cutting the tubes to size. The tubes are steel alloy — the same type of metal used to build small airplane fuselages — and made by Columbus or True Temper. The frames usually end up weighing 3.5 to 4.5 pounds. When the tubes are cut, he files the ends so they can fit together smoothly; a frame jig that can be adjusted to a variety of angles and lengths helps with this. With the pieces on the jig, Eric tack-welds them together one by one, so that they stay in place for the true welding, which is the real art of frame building. Holding the steel welding material next to the joint, he melts it into little puddles that look like a stack of shiny dimes offset from each other. Each one should be circular and evenly spaced, and the goal is perfection.

Once the frame is welded together and Eric tests it for straightness, they send it off to one of two frame painters in Oregon and Colorado. For the base price of \$1,275, you can get a basic frame painted in two colors, either wet-painted or done with a more durable powder coat, which can't really chip because the paint is ionized to the steel. Pay a little extra for more colors or a custom design. A complete bike, fitted with all the

components and ready to ride, will run between \$2,500 and \$5,000.

Paint jobs are the biggest variable in



the frame cost — and the most fun part of the process for the customer. Raina sends clients home with a color wheel and works with them on designs that can be built into the paint. One customer wanted chicken tracks up and down the frame, with the phrase “The Running Chicken” painted on. If you're going to have a custom bike, you might as well have a custom paint job.

#### **PENGUINS ON THE ROLL**

Eric and Raina chose to name their bike business after a flightless bird because, according to Eric, the penguin is purpose built. “A penguin has a roll of fat to protect its eggs, and wings not for flying but for swimming. Nothing on a penguin is superfluous or flashy,” he says. The same holds true for the bicycles.

Cathy Boedtke, 53, can attest to that. She purchased a 650B mountain bike — a unique size that makes it easier to roll over obstacles, yet keep the right geometry for smaller riders — in January 2009. Boedtke, an avid rider with sandy blond hair and blue eyes, lives in West Windsor, Vt., near the single track trails in the Ascutney State Forest. She rides a few times per week. She discussed the pros and cons of the 650B at length with Eric, spent hours picking out a color and tweaking the design with Raina, and is happy with her decision. “It gave me so much confidence,” Boedtke says of the bike. “It's probably mental, but I'm sure a lot is physical, too.” **UVL**