



Toy Story

How the creator of the Superplexus turned a childhood idea into a lifelong passion. By Michael McGinnis

While visiting my family in Colorado in 2002, I came across a captivating object sitting on a shelf in my sister's house. It was a cantaloupe-sized plastic sphere that housed a labyrinth of purple and turquoise colored ramps, tubes, and drops. It had a small steel ball rolling around in it. I needed no instructions to tell me that this was a puzzle, the object being to roll the ball through the three-dimensional maze from the starting point to the finish without having the ball fall off the track.

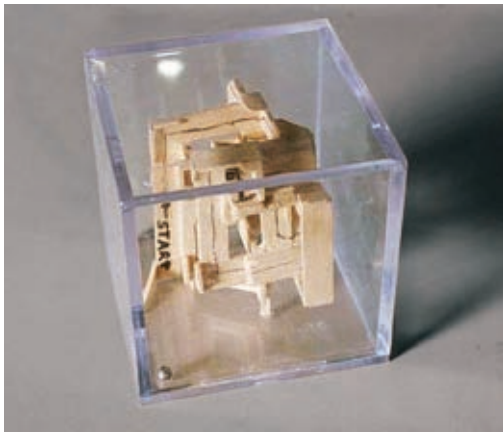
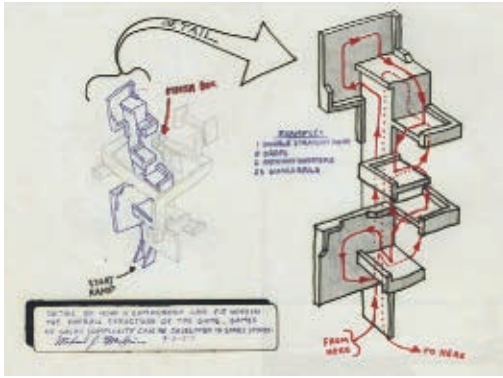
I thought it would be easy to solve. A week later, I was still spending a couple of hours a day trying to guide the ball to the end. But instead of feeling discouraged and frustrated, I felt challenged and encouraged to keep trying.

The thing was called the Superplexus and was

made by Tiger Electronics, a division of Hasbro. I didn't solve it until weeks later, and when I did, I re-challenged myself by seeing how quickly I could complete the maze. After a few months, my sister and her kids wanted it back, so I had to part with it, but I never completely forgot about it, and in 2007 I went online to order one for myself. I was pleasantly surprised to discover that the creator of the Superplexus, Michael McGinnis, had a website, and that he lived in Santa Rosa, Calif. (a 15-minute drive from MAKE's office) where he taught 3D design at a college. I contacted Michael and we started a correspondence. I asked him to write about the origins of the Superplexus for this issue of MAKE. This is his story.

—Mark Frauenfelder, editor-in-chief of MAKE

Photography by Rebecca McGinnis and Michael McGinnis (far right)



Having an idea is easy. Drawing it out can be challenging. Making it physically is an altogether different experience.



ROUND IT UP: Superplexus creator Michael McGinnis (far left) pictured with his Giant Superplexus model; (this page, counterclockwise from top) an early sketch and the finished model of the Equilibre Hable, precursor to the Superplexus; the new Perplexus toy.

Superplexus evolved from a project given to me 31 years ago by my 11th-grade art instructor, Ed Hairston. His project: design a board game.

I couldn't follow directions very well and had trouble reading and studying, or even knowing what was really expected of me. For example, in chemistry, we were asked to calculate the thickness of aluminum foil. While the other students used atomic weight ratios to measure the foil, I simply folded the piece over and over again until I could measure it with a wooden ruler, then divided that thickness by the number of folds. (Of course, I had to crush it in a vise to remove the empty space to get an accurate result.) I now realize that a hidden learning disability provided me with a unique way of looking at things.

Art Class Assignment

Since I was bad at board games, and felt especially terrible about losing or even beating others at them, I decided I'd rather design a maze. My family had just relocated to California from Illinois, where my friend Dale Lomelino and I spent innumerable hours creating complex mazes. In coming up with an idea for Mr. Hairston's assignment, I initially drew a design for a Marble Race Game. It was to have four

colored marbles in four side-by-side tracks. Players would compete to see which marble could make it to the bottom first. How would one release all of the balls at once? How would the winner be determined? How can a curved track guarantee that all four tracks are the same length? What a boring idea!

So, I flipped the paper over. I had a thought: "How can I make a 3D labyrinth with a BB running around in it?" I began to sketch and realized that it couldn't be like the popular maze game Labyrinth, with holes as obstacles, or it would be impossible to see. I drew a cube, and along the inside surface was a continuous road — an aqueduct/bridge/Great Wall of China-like path. A cup was at the end for the ball to rest in. There was no top or bottom; it was relative to how you turned the cube. I presented the drawing to Mr. Hairston, who directed me to make a model.

The model was constructed of balsa wood and glued with Elmer's Glue-All. I called it Equilibre Hable (meaning balance skill). It was a hodgepodge of ramps and railings in a clear, 3-inch plastic cube and was both hopelessly ugly and instantly intriguing. It was so difficult that I still have never gotten to the end! The school principal borrowed it for a month or so, and this model became my family's pastime at

nearly every gathering for years to come. (Twenty-three years later my student Matt Wong became the only person to finish Equilibre Hable, and he did it on his first try.)

No Traction

I was convinced that this thing could be a real product. All I had to do was get someone to grasp the concept and run with it. Someone in the toy world would take it on, design a beautiful and elegant version, manufacture and market it, and I'd just watch it all happen. How wrong I was!

Two years passed before I dared to research toy manufacturers and make calls. No one even took the time to look at it. In hindsight, this was a good thing. I didn't have the skills or maturity to take the game to the next level. I was fearful of making a new design and physical model. At this point I could only draw up ideas. I did discover one thing: the game was about a concept, not a particular design. It was ramps, railings, and turnarounds. This idea was far too open-ended for me to solve at the time.

I can only describe the next phase as the lost years. I was in college working toward a degree in sculpture when a feeling came over me. How could I contribute to the mass consumerism and greed of our culture by making a commercial object? Think of all the resources used and the pollution that would result from being part of the Big Problem. Eventually I came to my senses, realizing that this was a thing of joy, and, if made properly, would not end up crowding landfills or washing up on beaches.

Refinements and Disappointments

Nine years had passed since I'd made the first model. Equipped with a master's degree in sculpture, I began teaching at Santa Rosa Junior College. I had time to work on the idea again. I did lots of theorizing about the essence of the game, and I had become much better at drawing and aesthetics. My new bride, Becky, encouraged me to pursue Psychopath (its new name).

I finally began to better define the basic elements: on-ramps, straightaways, drops, pathway inverters, complex inverters, single- and double-sided ramps, angles, guard rails, tunnels and tubes, transfer rails, and finish boxes. Injection-molded plastic parts could be cemented together.

Within a year, we fell victim to one of those invention submission scams and spent good money hiring a company to generate a marketing/manufacturing report. Armed with this useless information, I got

nowhere with the game. We hired a consultant who gave us marketing ideas that went nowhere. Again, it was a good thing, because my design sense was still too unrefined.

Another ten years passed, during which we had two children. It was 1997. I continued teaching art courses, and pursued patents and business prospects for mat cutter designs and picture framing systems as a way to earn extra income. This five-year exercise ended up being successful (only in my mind) because I learned about confidence and how to work with industry. Freshly freed from working on those inventions, I was eager to delve once again, deeper, into the game.

Breaking into the Toy Biz

Out of the blue, I asked my digital arts student Erin Montague if she knew anyone in the toy industry. "My brother!" she exclaimed. Erin's brother introduced me to Dan Klitsner and his team at KID Group in San Francisco. KID was well known and respected in the toy industry as inventors. They license ideas to all the major players.

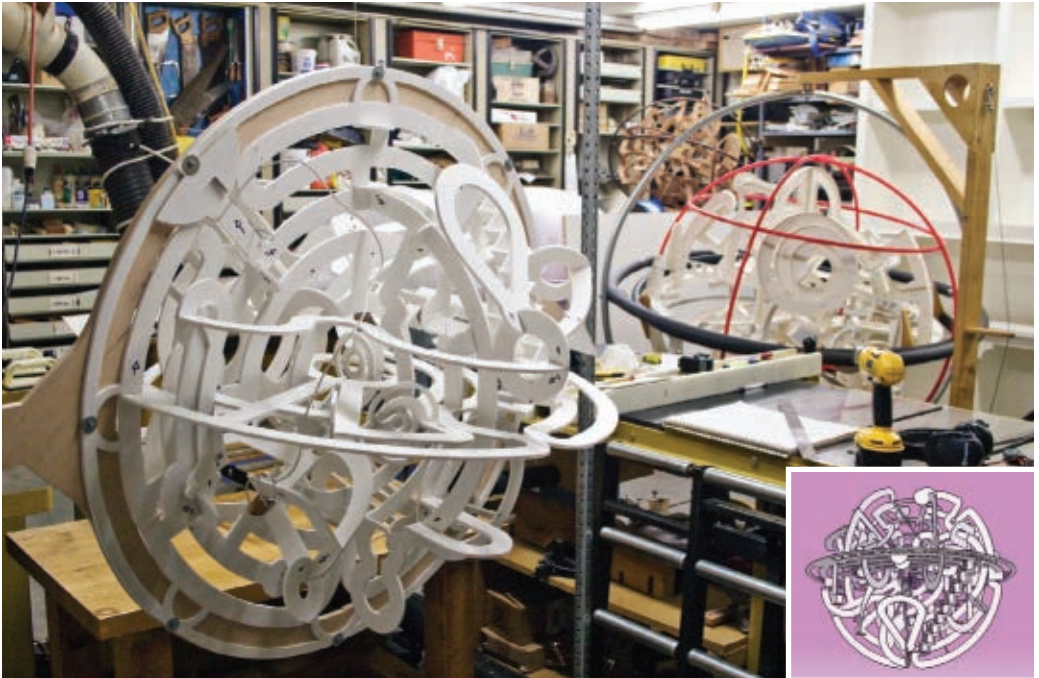
Over the next two years, I worked on a series of cube models, refining concepts, while KID pursued contacts and offered advice on design issues. Dan would say, "We have a meeting with X tomorrow. Can you make a new model by then?" I'd stay up all night, travel to San Francisco in the morning, and drive back to my class in the afternoon. This was an awesome time.

KID made a deal with Stewart Sims (the guy who brought Rubik's Cube to the free world) to make and market Plexus, the latest name for my game, which then became Perplexus. Sims was with a startup company called Next Electronix. KID gave me two days to devise a new 4-inch spherical model, and three days to construct it.

Next Electronix was suitably impressed, and we collaborated for the better part of a year on tooling, prototypes, samples, production models, and packaging designs. We produced a TV commercial reminiscent of *That '70s Show*, with kids playing the game in their basement. I flew to New York for the American International Toy Fair, where the game was officially released. How exciting!

Superplexus Goes Global

Well, the toy fair was a great success, but Next Electronix was not. They went belly-up because of internal problems. The game ended up in boxes somewhere in a subsidiary of Playmates Toys. It



RAMP IT UP: Before any drawings, a full-scale foamcore model (above) was made to work out the design for Superplexus Vortex. Next came the CAD drawing for use with the ShopBot. Below, McGinnis and James Yonts worked jigs to hold the structure in different configurations; McGinnis carved a rubber arrow stamp, applying almost 1,000 arrows to guide the way, then applied the rails that would hold the ball.



Photography by Michael McGinnis and Laura McGinnis (bottom right)



ROLL IT OUT: The internal structure, nearly complete (left). The final model encased in plexiglass (above). McGinnis' sister Mary (opposite) playing with *Superplexus Vortex* at the Sonoma Valley Museum.

took a while to get the rights back. Freshly wounded (but secretly relieved because I was not happy with the results), I built a very involved 8-inch spherical version unlike anything that came before. It was the first version of Superplexus.

KID loved it, and asked that I make a new design that could be manufacturable as soon as possible because they were meeting with Tiger Electronics (Hasbro) in a week and wanted them to see it. One hundred hours of work later, I had a design. It was too difficult to draw, and could only be designed by making it. Tiger went for it! I worked with engineers and CAD designers almost nonstop. It was the most intense, work-filled, rewarding six months of my life.

By the spring of 2002, Superplexus hit stores worldwide. It sold more than 700,000 units in a four-year period. It was listed in the "Top Ten Christmas Gifts of 2002" in the United Kingdom. It did quite well in Japan as well, where it was packaged with stickers in the shape of eyes, to look like a brain.

Killed and Revived

Despite the game's positive reception, the quantities sold were less than Hasbro's vision of success, and Superplexus was soon after discontinued.

Recently, we discovered several Chinese counterfeit versions; one even made it to the White House, given as a gift to Malia Obama during a visit to Pixar. One manufacturer, Buksi, has agreed to pay royalties to KID and myself in order to market a version in the United States as Perplexus (perplexus.net), distributed by PlaSmart. So you'll soon see Superplexus available again (sans electronics).

Giant Superplexuses

The latest phase in my creative endeavor is the Giant Superplexus. I built my first 4-foot diameter version for the 2007 Maker Faire in San Mateo, and it was by far the most complex version to date. This design had little in common with the 7-inch production model; it's got so many circular shapes in the design that I've dubbed it *Superplexus Circles*. Making the interconnected pathway system took approximately 100 hours, a difficult and challenging experience.

This model has since been exhibited in many venues, with amazing response. Thousands of people have enjoyed seeing it, although only a small percentage get a chance to actually play. I've tried to limit playtime to around 5 minutes unless the



player does not fall off the pathway. (If they're that good, how can I tell them to stop?) Two people have actually gone from beginning to end without falling off, taking more than an hour to do so.

I recently completed my first Giant Superplexus commission, for the Sonoma Valley Museum, called *Superplexus Vortex*. I used a completely new pathway design. It's enclosed in a 36-inch acrylic sphere, and is made from a variety of materials, including high-grade plywood, hardwoods, metals, and plastics. In addition, a major museum is contemplating a commission, along with several other venues.

Giant Superplexuses are complex works of interactive art, and I am very fortunate to have them as my most personal creative outlet. This art form stretches my mind while providing joy to others. Although I am adept at other media and concepts, no other pursuit holds such an iconic place in my heart. Here I feel as though I am truly contributing to the language of the world.

Word to the Wise

What I've learned from my experiences can be boiled down to a few typical life lessons: nothing worthwhile is easy, or ever turns out as expected, or comes out

of thin air. Having an idea is not the same as making the physical thing. The best way to solve a problem is to build it. Setbacks are just another step forward, perhaps along another path. Not all ideas are good ones. Ask and accept help from others. There is always room for improvement. There is no such thing as the perfect solution. Although money can't solve all problems, it sure does help.

And, when you believe enough in something and are willing to work toward a goal, even the seemingly impossible can be accomplished.

Do you want a Giant Superplexus of your own, or for a museum or other public venue? Do you wish to collect limited-edition, handheld Superplexuses? Would you like to exhibit them in a gallery? If so, let's talk! mmcginnis@santarosa.edu

Michael McGinnis is an artist/maker who enjoys making interactive works: furniture, digital art installations, Superplexuses, inventions, and more. Michael teaches sculpture and design, and is the Art Gallery Exhibits Specialist at Santa Rosa Junior College.