

## The Design

### A Challenge

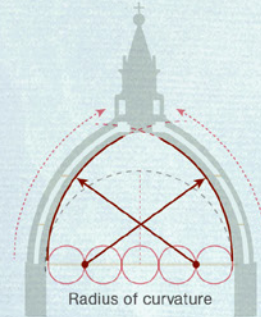
Florence began to build a new cathedral in 1296. Wars, politics, and plague slowed construction, so work on the dome didn't commence for more than a century. Architects had to compete to design each stage of the project. Brunelleschi's scale models—perhaps including the one shown at left—won him the job every time.



Model of lantern often attributed to Brunelleschi

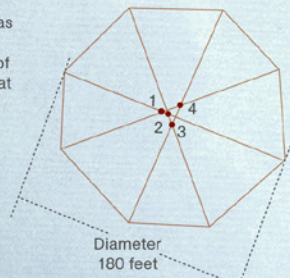
### Shapes and Lines

The geometry of the dome, built on an octagonal base roughly 145 feet wide, is complicated. It has inner and outer shells, and its profile is elongated. In the simpler case of a semicircular dome, the radius hits the center of the base. Here, the radius runs between the curvature and a point that's one-fifth the length of the base.



Radius of curvature

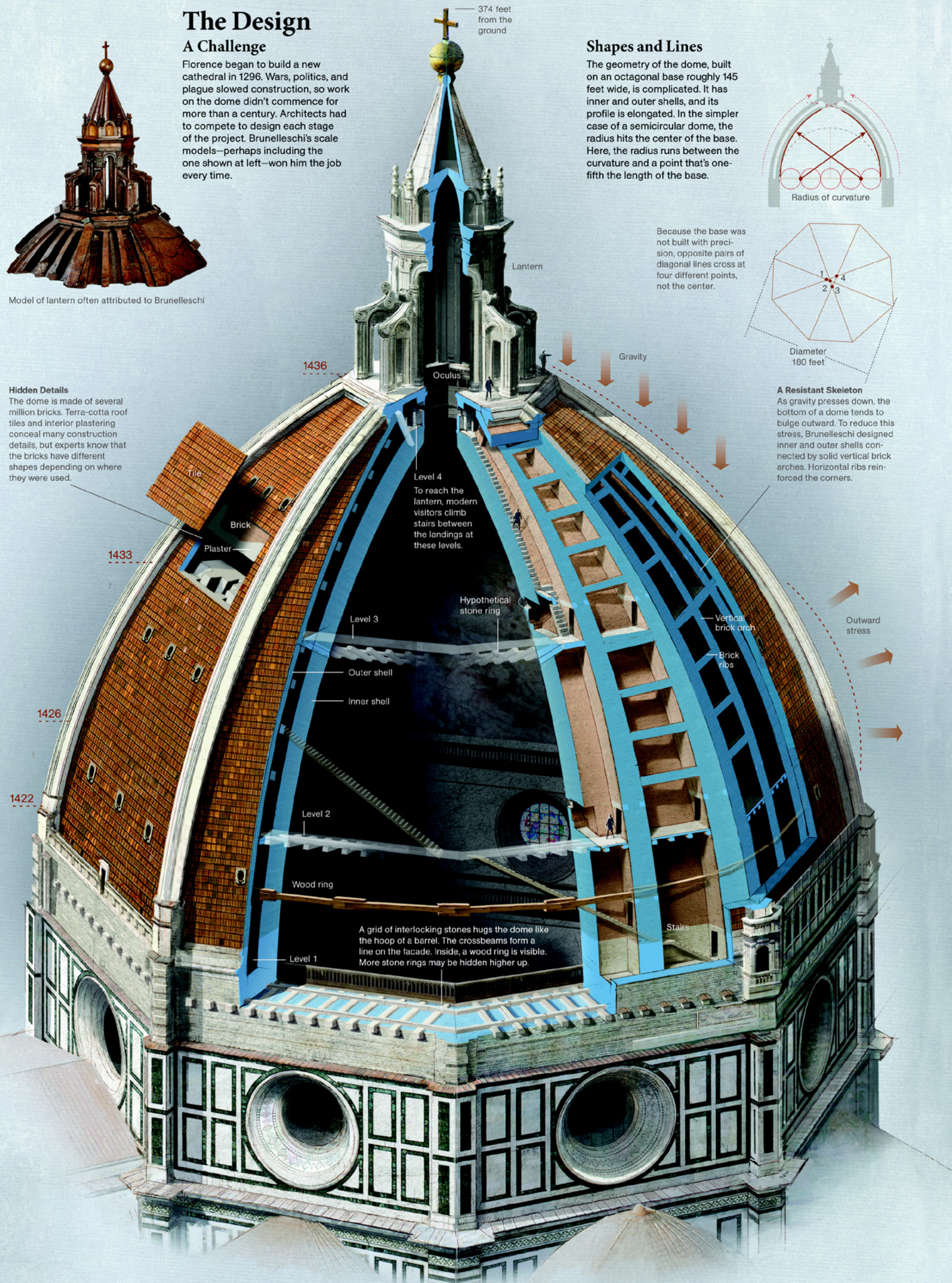
Because the base was not built with precision, opposite pairs of diagonal lines cross at four different points, not the center.



Diameter 180 feet

**A Resistant Skeleton**  
As gravity presses down, the bottom of a dome tends to bulge outward. To reduce this stress, Brunelleschi designed inner and outer shells connected by solid vertical brick arches. Horizontal ribs reinforced the corners.

**Hidden Details**  
The dome is made of several million bricks. Terra-cotta roof tiles and interior plastering conceal many construction details, but experts know that the bricks have different shapes depending on where they were used.



# Fernando G. Baptista



Fernando Baptista was seemingly born to work at *National Geographic*. Either that or the magazine, founded in 1888, was created so that Baptista could work there one day. Baptista was first introduced to the magazine in 2006 when he received a call from the magazine's graphics director at the time, Charles M. Blow. The call changed his life, yet he himself has hardly changed at all since then: he is still modest and hardworking, a sort of Renaissance man amassing thousands of skills.

Year after year, juries and colleagues from around the world have attested that Baptista is one of the leading contemporary infographers. Nevertheless, he keeps doing what he does, far removed from the accolades. He is happy, but his feet are on the ground. Above all, he enjoys his job—something he could never have imagined as a boy in the gray, industrial city of Bilbao in the 1960s and 1970s. He always loved to draw, but the leap from that to *National Geographic* felt to him like something out of science fiction.

Baptista, a sci-fi fan with a childhood penchant for the *Star Wars* Jedi master Yoda, grew up preferring to stay home on weekends drawing and modeling instead of running around with his friends. "I spent endless hours in my room. They would call and order me to come out, but I preferred to watch documentaries and keep drawing," he remembers. He was more interested in learning from his father, a draftsman, who worked amid sheets of paper, rulers, and tracing paper, all meticulously ordered, which fascinated the future infographer.

"He showed me how to use a brush and China ink. And my mother would bring me children's comics every Friday. I treasure them now like gold," he confesses.

Baptista was, naturally, the best with pencils and paints in his class. He drew everything and was constantly sketching in the margins of his books. After school, he would leaf through comic books and art catalogues over and over. He copied vignettes and learned anatomy by studying Burne Hogarth's Tarzan comic strip. He built models and made customized, pliable dolls based on whatever film he had just watched, but he preferred building things to playing with them. "I was impressed by a documentary I had seen about how the special effects in *Star Wars* had been created. That is a real job, I thought: designing ships and creatures, and animating them. My dream was to be able to work doing that."

And then infographics found him by chance. His mother urged him to apply at the Department of Fine Arts at the University of the Basque Country, and he began a doctoral thesis on the war machines of Leonardo da Vinci. At the same time, in 1991, he began working as a drawing teacher at an academy and published his first work as a freelancer. The Apple Macintosh came out and he enrolled in a course on desktop publishing and, shortly thereafter, he saw an advertisement in a newspaper saying: "seeking an illustrator who works with computers." In 1993, he joined *El Correo*, the most important regional daily newspaper in Spain, based in Bilbao. There he became part of a team that