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## Four Questions with Roma Agrawal

By Patricia J. Murphy | Aug 08, 2022

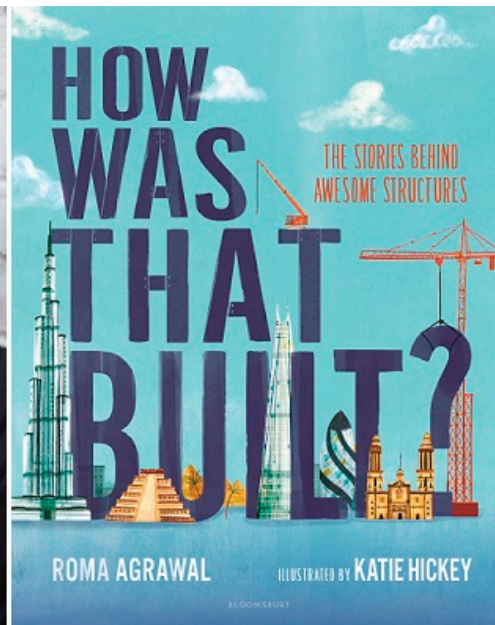
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Johnny Ring

Roma Agrawal has changed London's skyline. Today, she's hoping that she can change the face of engineering, too. Agrawal is an award-winning Indian-British-American structural engineer from West Hampstead, England, and the author of the adult nonfiction book *Built: The Hidden Stories Behind Our Structures*. Recently, she

Roma Agrawal.

*adapted the book for young readers: How Was That Built? The Stories Behind Awesome Structures. PW spoke with Agrawal about her experience as a structural engineer, How Was That Built?, and her mission to build awareness and interest in STEM/engineering education and careers—especially for women of color—from the ground up.*

### What exactly do you do as a structural engineer? Can you describe some of the structures you've worked on?

My job as a structural engineer is to use math and physics to make structures stand up. What this means is that we look at all the different forces that are attacking a structure. So, you've got gravity trying to pull buildings and bridges down. You've got wind trying to knock them sideways. You've got earthquakes in some parts of the world that shake them, and we basically have to think about all of those. We must also think about the materials from which we're trying to create a structure, and then make sure the frame or skeleton that we create is strong and stable so that it can withstand all of these forces. Over my 14-year career, I've worked on a total of eight structures.

My very first was the Northumbria University Footbridge in Newcastle, England. It was built about 18 months after I started working on it. So it's like my "first baby" Another important structure in my career was the Shard, which is the



tallest building in Western Europe. It's best described as an elongated pyramid shape, and was designed by the incredible architect Renzo Piano. I spent six years of my career on this building. You could say that I basically grew up as a structural engineer alongside it.



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The Shard in London.

**Dow did you transition from building structures to writing about them? And what are your hopes for your books?**

I wrote *Built* because nearly every time someone asks me what I do for my job, and I say, "I'm a structural engineer," some people will have these strange looks or confused expressions, and ask me, "What does that mean?" And, there are others who will ask, "Are you an architect?" And I'll say, "No, but I work with architects." So, basically, I've realized that people do not know that every building that we occupy could not exist without structural engineers. Because of this, I became really keen to ignite and/or reignite the curiosity that we all have about our surroundings. And I wanted to help people look at structures in a slightly different light—and get a glimpse into a world that perhaps doesn't feel accessible to them.

When *Built* started selling well and was translated into several languages, my publisher approached me about writing a children's book. I loved the idea except that I swore that I'd *never* write another book again—because it's so hard! But I decided to do it because I wanted to bring engineering to life for children in a different way. Katie Hickey, the book's illustrator, was also able to "explode" the buildings so that readers can see parts of them that aren't normally accessible—or visible. Her illustrations bring a warmth, fun, and cheekiness to the topic, too. Our goal was to combine engineering and art to create something beautiful.



An illustration by Katie Hickey from *How Was That Built?* shows the construction process behind the Shard.

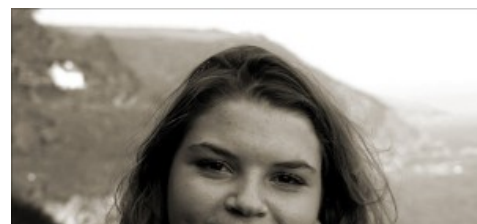
I hope that both of my books find their way to libraries and cultural centers. I'd also like my children's title to find its way into the hands of kids who would never have considered becoming engineers and/or scientists. Hopefully, when they read *How Was That Built?* they might say to themselves, "Wait, I could do that?"

**These hopes are part of your personal mission to increase interest in**

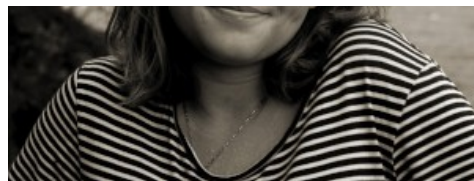
**engineering and representation of women with diverse backgrounds in science education and careers. Can you tell us more about this mission—how it began, and why it matters to you?**

I'm trying to promote STEM and engineering to marginalized communities, specifically women of color, and people from different socioeconomic backgrounds who might not normally consider engineering as a career path. Unfortunately, there are many stereotypes surrounding engineering that particularly put off people from minority backgrounds. I'm trying to make them aware that STEM careers—especially a career as an engineer—can be an option, so they can make a more informed decision about what they could do with their studies and careers. Ultimately, I want to open their eyes to the possibilities out there.

Because of my work on the Shard, which is such a presence on the London skyline, it has captured the imagination of people who weren't ordinarily interested in engineering. And when people would see me and notice that I don't look like the typical engineer—i.e., I'm brown, young, and a woman—they started calling me a role model



and asking me to speak to their students. And while I found this terrifying at first, I soon realized that I *loved* sharing my enthusiasm for engineering with young people. It all snowballed from there.



Marcus Thom

Katie Hickey.

### Who have you been speaking to—and why? Why should science education matter to all of us?

Today, I speak to school children and university students. I've also spoken to parents, caregivers, and teachers who play a big role in the choices students make in their subjects [of study] and careers. I appear at various science festivals, panels, and conferences, on YouTube, and on my podcast. I'm attempting to use all kinds of media to create content that is engaging and accessible to everybody regardless of what they have or haven't studied. I'm still figuring out how I can make the greatest difference and impact.

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To his end, I have also met with university faculties, science organizations, and governmental departments in the U.S. to talk about the importance of science education at the primary and university levels, and about the hiring and retention of women in STEM. And I've been asking questions about the aims of science education, the skills that we're trying to nurture, and what we can do in education and the workplace to make things better—to help create the infrastructure and the support system to ensure that women can and will thrive as they go through the education system, and then find themselves in the workplace.

I want science education to be seen as creative, engaging, exciting, and innovative. Scientists and engineers are the ones who are going to change the world. Who else is going to find renewable energy, help food shortages, or help with disease? We've seen this with the pandemic—the amount of work that went into creating vaccines, which has helped save so many lives. I would love to see science and engineering education reflect this, and evolve quickly enough to

keep pace with change.

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