

# AN INTERVIEW WITH DR. ELIZABETH TASKER

One day when I was working on a later draft of this book, I walked into my local bookstore and saw *The Planet Factory*, Dr. Elizabeth Tasker's book about exoplanets, on the Read This! table. I knew I had found the astrophysicist for *The Center of the Universe*. Luckily for me, Elizabeth was happy not only to be turned into a fictional version of herself, but also to be interviewed about her career and thoughts on space science. I'm thrilled to share her responses here.

## **1. How did you come to pursue a career in astrophysics? Did you always want to be a space scientist?**

*When I was a kid, I was absolutely certain I wanted to be a country veterinarian, but in truth, there was little about a rural vet's life that actually matched my skill set or temperament. I enjoyed the theoretical models and ideas of all the sciences, but I was a hazard in the lab (which would likely have extended to the stall where a poor cow was trying to give birth).*

*But since the age of nine, I'd also been captivated by space. My dad had taken me to the London Planetarium as a birthday*

*treat and bought the picture of Saturn that is mentioned in The Center of the Universe (it's all true!). I'd done school projects on the solar system and bored everyone to death with strange facts about black holes.*

*When I was thirteen, my school gave everyone a careers assessment test where this stood out clearly in both my aptitudes (physics all the way) and interests (astronomy and writing). After that, I started to re-think the cow idea.*

## **2. What is your favorite piece of space trivia?**

*That the surface of Venus can melt lead and the longest a spacecraft has survived on the Venusian surface (to date) is about two hours. I like this one because Venus is a planet almost exactly the same size as the Earth. If we were to see Venus as an exoplanet and make an estimate of its surface temperature based on its distance from the sun, we might guess about 27°C (80°F) — a nice temperature for a beach trip! The fact that Venus is so much hotter shows how much there is to learn about Earth-sized planets in our galaxy. Why do we have two planets, nearly the same size, around the same star (our sun) that are so completely different? What does this tell us about the chances of finding another habitable planet? I find this all very exciting.*

*I also like the trivia that there are more stars in the universe than grains of sand on the beach. I was once asked how many stars there were when I told a border control guard for the United States that I was an astrophysicist. I replied with this trivia and he asked me which beach I meant. I said, "All the beaches! There*

*are more stars than the sand on all the beaches in the world.” He refused to believe me and I worried for one nasty moment that he wouldn’t let me into the country! (He did.)*

### **3. What excites you about your field right now?**

*In the last twenty-five years, we have gone from knowing just the planets in our solar system to thousands around neighboring stars. This told us our little system of planets is not alone, but what we don’t know yet is what these new worlds are really like. I think the next twenty-five years will change this, as new telescopes will be built that can detect the atmosphere around exoplanets. The gases in the atmosphere are a real indication of how a planet forms and what might be going on at the surface. We’ve found many Earth-sized worlds, but will any of them really be like our Earth, or did they form in wildly different ways?*

### **4. What is the coolest thing about your research?**

*I really like computer programming. When I began my PhD in the early 2000s, I was captivated by the idea that you could build whole sections of a universe in a computer. It is like making physics your giant toy box: you can turn on and off effects such as magnetic fields, star formation — even gravity — and watch what happens. Using powerful telescopes is of course amazing, but you don’t get to play around with the universe. Learning how to code models for supercomputers (room-sized computers*

*that have thousands of processors) was a huge draw to the field for me.*

## **5. What has been your most surprising finding?**

*In truth, science research is rather sparse on the “Eureka!” moments, but the reality is actually even more satisfying. In research, you explore one aspect of a problem that might not tell you much on its own, but when combined with the work of other researchers can reveal something amazing. One of my favorite debates is from my studies in star formation, where I ran computer simulations showing that cold star-forming clouds of gas in our galaxy may frequently collide. Another research team had previously suggested that such collisions could be responsible for creating massive stars, much bigger than our own sun. A different group were observing evidence that this might actually occur. All together, our work suggested that these so-called cloud collisions might really be responsible for quite a bit of star formation. It was not a single person, but the results from researchers all around the globe.*

## **6. What advice do you have for young adults interested in studying space sciences?**

*I actually love the advice my character gives Grace when she tells her she wants to be an astronomer. In the book I tell her she can still find astronomy fascinating but not pursue it as a*

*career. Astronomy is indeed a wonderfully exciting field and I would encourage anyone with an interest to explore their curiosity to their heart's content. But life is full of opportunities and it's always worth keeping an open mind to what else might be out there. If I had not done this, I would have probably been a very bad and unhappy vet!*

*Even when I went to university, I intentionally studied physics for my undergraduate degree, rather than looking to specialize in astronomy or astrophysics early. This was because I knew there were many areas of physics we don't hear much about at school and these would be fascinating.*

*So I would say if you want to do space science — go for it. I have complete faith you'd make an amazing scientist. But don't hold yourself back by not exploring other areas that also catch your interest. As my character tells Grace, you can still love astronomy but not be an astronomer. I would add that it is also possible not to be a research astronomer, but still make a huge impact on the field.*

## **7. Who do you admire in space sciences?**

*When writing my answer here, I kept changing my mind! This isn't because I'm very indecisive (okay, it's maybe a little bit because I'm indecisive) or because I've not felt the same thrill as Grace when I've attended a talk by a scientist I'd heard about (I certainly have). It is because it takes the enthusiasm, passion and commitment of so many different people in many different areas to advance science, from research to communication to politics.*

*For example, when I was Grace's age, I loved hearing the story of how Jocelyn Bell Burnell discovered pulsars (a type of dead star) during her PhD. Pulsars emit a flash that is so regular that Bell Burnell and her adviser first thought it was possible this was a signature from an extraterrestrial life form. My love of computers meant I was also in awe of Margaret Hamilton, who developed the software for the Apollo space program and is often pictured with a printout of her code that towers over her head.*

*And then, I keep up with much of my space and astronomy news from great science communicators such as Phil Plait and Emily Lakdawalla. I also avidly read the blog posts by Italian astronaut Samantha Cristoforetti when she described life on the International Space Station.*

**8. If you could give your teenage self a piece of advice about anything, what would you say?**

*I would tell her not to worry that she might not be good enough. In science we often talk about something called "imposter syndrome." It means that you think everyone around you is better than you. Of course, it's absolutely not true, but almost everyone tends to suspect this is the case and that sooner or later, they'll be "found out" to be not worthy of their position or degree or people's respect.*

*I definitely felt this way: I didn't find school easy and I wasn't top of my class; in fact, I was bottom at math when I was eleven years old (and let's never talk about French tests). I really wanted to study science but even as I became a stronger student, I*

*suspected my good grades were just due to luck that would one day run out. I am really glad that this common insecurity is now something that is being talked about a lot more in the field. Success depends on many things and it's very rarely about raw, born-with-it ability. It's passion and hard work all the way.*

You can learn more about Dr. Elizabeth Tasker's work at [www.elizabethtasker.com](http://www.elizabethtasker.com).