

# A Reader's Guide to *The Disordered Cosmos*

By Shirley Ngozi Nwangwa

## A Conversation with Chanda Prescod-Weinstein

**You write early on in the book that “the universe is wonderfully queer-er than we think.” Who were you envisioning as an audience for this?**

I was writing to my seventeen-year-old self. I realized I was queer right before my eighteenth birthday. Before I went off to college I really didn't know, even though I was a founding member of my high school's Gay-Straight Alliance. I thought I was just being a really good ally. LOL.

I knew there would be another queer Black girl who needed a book that was honest about how shit everything is. But that said: this is also *yours*. That is what I've wanted this book to do. There is nothing I can do about what happened to me, the things that I've gone through. But hopefully the knowledge and understanding I've gained by living through the things I've lived through mean that I can give someone else better tools to navigate similar experiences. Maybe I can even help radicalize them by saying, *Think bigger than just about making space in the room, think about whether this room should be here and what shape it should have and who should be in charge of it*. I wanted to create for the person who might be like me in some ways and unlike me in other ways. I hoped a lot of people would read the book, that it'd be valuable to different people for different reasons. But I think at its core that the book is for Black girls and femmes who like science.

**I'd be lying if I didn't tell you that the chapter title "Spacetime Isn't Straight" really sent me. I yelled out, YES! I already knew that this book was going to be gay as hell. It's also really funny.**

Physicists like wordplay. You see a lot of that in the book. That's cultural, it's part of physicist culture. It just happens to be that because I am different from other physicists, my wordplay is a little bit different, too. I thought of "spacetime isn't straight" as a joke and then texted Brian Shuve, a white, gay theoretical physicist who is a member of Particles for Justice with me. I said, "I can't really name a chapter this way, can I?" And he said, "You 100 percent can." This is what happens when queer physicists talk to each other: we give each other permission to do things we might not feel we had permission to do otherwise. And even I had to have that experience as part of the making of this book.

Brian was a really important reader for the book. Very important. All of my readers were. One of the reasons is that he was trained more traditionally than I was, as a particle physicist at Harvard. He knew all of the players. He knew there were things I'd said, that he'd heard me say, that I'd left out of the early draft he read, and he'd suggest that I add those things in. The kind of reader you want when you're writing a book is someone who will tell you about yourself—in a good way, too! I have a whole team around me, giving me permission.

**Where does the "Dreams Deferred" part of the book's subtitle come from?**

*The Disordered Cosmos* was the name of my blog in graduate school, and I got that name from a characterization of my first peer-reviewed scientific paper. You can have these non-local connections between different points in spacetime, so the connections wouldn't be orderly; they would be disordered.

I think a lot in terms of Langston Hughes, lines from Langston Hughes, which shows in the chapter titles. "Dreams Deferred," in reference to Hughes's *Montage of a Dream Deferred*, was important to include in the subtitle because it is recursive. The book represents a dream deferred, the book is about dreams deferred, the book is about challenging structures that defer dreams. The book was aimed at the end of dreams deferred as a phenomenon for Black people.

I am a literary reader at the end of the day. Look, I found a way to mention *Mansfield Park* in a book about physics. I wanted the title of the

book to sound literary; it mattered to me that the title had craft in it. I wanted to do more than indicate what the book is about. I wanted it to have poetry in it.

**I found it devastating to read in the book, “There have been times when I felt like the astro/physics community was actively ruining the stars for me because of its unwillingness to detach from dehumanizing ways of making science happen.” I couldn’t fathom what it might be like to feel as if your colleagues, all those guarding the gates, had the power to extinguish something as magnanimous as the stars.**

It happens for a lot of people. We see it in the stats, we see people coming in, being excited to be Black and STEM, and then by the end of frosh year they’re not majoring in STEM majors anymore. We see it with the people who say, “I’m going to be a physicist,” and then graduate with their degree and don’t go to graduate school, not because they found something else they love, but because they found something that doesn’t hurt as much. This is the real problem: Black women are walking away because it hurts, not because they fell in love with something else. It’s okay to fall in love with something else, and it’s okay to have multiple lives. What’s not okay is for the thing you love to hurt you. And the problem is that physics hurts and abuses people. I’ve written a whole chapter about how rape is part of the scientific story.

**You’ve said that you went back and forth about writing that chapter, and that you were nervous that it would speak louder than everything else, by virtue of the subject matter.**

I think that I’ve successfully scared reporters with that comment. That rhetorical trick worked! People have been really hesitant to ask me about that chapter, and really respectful. I have had to live through a lot of audacity regarding my rapist. In some sense, the chapter being there has become a solace; I ended up needing the chapter to be there. Because at least I told my story. But it has been a hardening experience. For the first few months, every time the chapter would come up, I would become dysfunctional for the rest of the day and there would be a lot of crying. Now I can just talk about it and it’s like, yeah, that happened, and I’m happy and at least he’s aging horribly, he looks terrible [*laughs*]. Survivors—I think that we’re entitled to be petty. We’re not entitled to take it out on other people, but we’re entitled to be petty, especially if

the subject of our pettiness is the perpetrator. I have heard from people that the chapter was useful to them, and I think that Lacy M. Johnson, author of *The Reckonings: Essays on Justice for the Twenty-First Century*, was right when she told me that writing it would give me control over my own story. I am glad I listened to her. I don't feel shame or sadness. It comes back to having people around you.

**How much do you think comprehending science matters to your readers? How were you thinking about this as you wrote?**

The universe is queer. It's really, really weird. If this stuff doesn't feel intuitive, that's okay. It's not intuitive for any of us—except maybe for drag performer and writer Amrou Al-Kadhi, who said, “Particles are themselves nonbinary,” like nonbinary people. So, that shit is intuitive for Amrou, at least.

This is something I address in my note to the reader, an addition to the paperback: I think the thing that I did not think about enough—and I will in future, this has been a learning experience for me—was how much trauma and anxiety people were going to bring to the science discussion. I am so grateful that people who have been told that they were bad at math, who had horrific experiences in their high-school physics classes, or who were told that they were not smart enough to take the physics class, picked up the book anyway. I have a deep appreciation for those readers in particular because I know that picking up this book was not a simple thing. I did not think about the fact that people are socialized to think that a book about science will have a test at the end. Maybe the test isn't in the book, but the test is out there, lurking somewhere, and you're either going to pass the test or fail the test. I don't think I did a good job in the introduction of setting readers up for a different experience. This is a genuine error that I made: I didn't take into account that I had to tell people there was no test, and that it was okay for them not to memorize what I was saying about science.

As I write in my note to the reader, I bet anyone who reads this book has some sense of what a quark is now, but can they write out the Lagrangian for the Standard Model of particle physics? No? Well, I also can't do that off the top of my head. I mostly know one term from it, and it's the term that's related to my work. I have twenty years of training under me. If you expect that you're going to be as good at this after 150 pages as I am after twenty years, either your expectation of yourself is too high or you think I'm not very good at my job [*laughs*].

People will tell me that the science stuff went over their head, that they don't think they really got it, but then make jokes with me about quarks and fundamental particles. And I'm like, *So you know about the standard model, you know that spacetime isn't straight, you know that Black people are luminous matter, you know there are quarks, you know there are neutrinos, you know there's this weird concept of spin, you know these things are out there! Are you the world's greatest expert? No? But who the fuck cares, that wasn't the point.*

### **How do you want this book to fit into academic study?**

I hope that it can be used as an example of how we can rethink science. The book is meant to be a holistic look at doing physics from the point of view of a Black, queer particle cosmologist. I hope it encourages people to rethink the established norms around all of those words, in some sense. I'm not primarily writing for academics. My intended audience, beyond my seventeen-year-old self, is anyone who's been told physics wasn't for them. This is an anti-gaslighting book. Physics is for you.

### **Questions for Thought and Discussion**

1. What are your thoughts on the author's suggestion that the term "dark matter" be replaced by "invisible matter"? Do other stand-ins come to mind? Should the term be left as is?
2. Consider the opening to the chapter "Spacetime Isn't Straight" (pg. 45):

*As a physics student I was told repeatedly that I intuitively experienced space and time as completely different phenomena. As a physicist I wonder if that was ever true or just physics professors projecting their experiences onto us undergrads. In reality, I don't think I ever gave it much thought before I was told what to think about it.*

What kind of harm is Prescod-Weinstein suggesting might occur when professors project their own experiences onto students? What effect might being taught the "right" way to think have on a young person?

3. What makes the concept of weak gravitational lensing an effective analogy for systemic racism? Where does the analogy falter? Are these kinds of analogies necessary?
4. One definition of freedom to which Prescod-Weinstein subscribes comes from the artist Shanequa Gay, who told the author, "Freedom looks like choice making without having to consider so many others when I make those choices" (pg. 7). What is your definition of freedom, and does Gay's sentiment resonate with yours?
5. What is another subject, outside of science, that you would like to see "queered" and why?
6. Prescod-Weinstein explains that gravity "is not a real force" (pg. 56), in the sense that what is actually occurring is the curving of space-time. How does this sit with you? Does this point of view have the capacity to change the way you interact with the world or do you feel entirely unimpacted by it?
7. Throughout *The Disordered Cosmos*, Prescod-Weinstein uses her own Blackness, queerness, and relationship to womanhood as vehicles in presenting a holistic perspective on physics and cosmology. Discuss the idea that the human, the personal, cannot be taken out of science. What do you think about the notion that even science writing that positions itself as detached necessarily incorporates the writer's identity?
8. The author describes the feeling of having her love of the stars actively ruined by those unwilling to "detach from dehumanizing ways of making science happen" (pg. 156). If you're comfortable with sharing: Is this an experience that's familiar to you? If so, how might the experience have impacted your work, your health, your joy?
9. Apart from the physics of melanin and weak gravitational lensing, which scientific topics—in this book or outside of it—can you imagine as being covered in the hypothetical science section of a magazine geared toward Black readers?
10. What makes physics, and science more generally, political? What makes it colonialist?
11. Did *The Disordered Cosmos* make you more trusting or more skeptical of science, the history of science, and the capacity of scientists to stick to their own standards? Why?

## **Chanda Prescod-Weinstein's *Disordered Cosmos* Playlist**

- "Lift Every Voice and Sing" (Live), Kim Weston
- "Final Form," Sampa the Great
- "Boot," Tamar-Kali
- "Balas y Chocolate," Lila Downs
- "Spinning Wheel" (Remastered), Dr. Lonnie Smith
- "Many Moons," Janelle Monáe
- "Cold War," Janelle Monáe
- "What Now," Rihanna
- "I Wish I Knew How It Would Feel to Be Free," Nina Simone
- "Redemption Song," Bob Marley & The Wailers
- "I Didn't Know My Own Strength," Whitney Houston
- "How I Got Over," The Roots
- "A Love Supreme, Pt. IV—Psalm," John Coltrane
- "Sally Ride," Janelle Monáe
- "Tell Me No," Whitney Houston
- "GhettoMusick," Outkast
- "Overcome" (feat. Nile Rodgers), Laura Mvula, Nile Rodgers
- "Dirty Gold," Angel Haze
- "We Here Now," MC Lyte, Mario
- "What I Did for Love," Emeli Sandé, David Guetta
- "Lift Every Voice and Sing," Art Blakey & The Jazz Messengers