Laurent John ([00:00](https://www.rev.com/transcript-editor/Edit?token=3Yvvw1-zYcxmVomOPrkhASrJwno5Oo--U6eHjEWWmgjFLR3Y-B4A2xSKl1E9OgdRKxt-qeEl-27UubaS1DxlGYni4cg&loadFrom=DocumentDeeplink&ts=0.33)):

Episode four: Dark Fecundity and Archiving for the Distant Future. In the final episode of the series, Weyland is invited on an audio space adventure to Andromeda with Somerset House Studios' artist and writer, Sonya Dyer, to explore how we can construct the future. Based on the archive we leave behind. Sonya Dyer is currently collaborating with Dr. Jeff Grube as part of a funded research and development scheme connecting academics from King's College London and residents of Somerset House Studios. Welcome to the Echoic Archive.

Weyland McKenzie-Witter ([00:34](https://www.rev.com/transcript-editor/Edit?token=-x7w3jLhK_ju7keXh85yBm-Q0HUmihDhDFnUoW6eempBrjp8jvh1fOTmC3HHjiUAFGQxfXoDLYAFZAB9vbe70yjIFzI&loadFrom=DocumentDeeplink&ts=34.59)):

Hello, Sonya.

Sonya Dyer ([00:43](https://www.rev.com/transcript-editor/Edit?token=V3-0B5xOz_Ka8H8R4fU4EAqw8DrQStTI5cTYo9VJlX2chBy30k4AL5lyS0ecY9ExUGQ6egZVqhA5a12a8uSTkTkN5LM&loadFrom=DocumentDeeplink&ts=43.08)):

Hello.

Weyland McKenzie-Witter ([00:43](https://www.rev.com/transcript-editor/Edit?token=O1Nsdf2rS0Liq5HbuzY_vHlBASMDzwXw1Fen4G5fycL89QeZUj9wXBNE_G1utV4MSojvnM24GTFxKUdL-EHeZvxw3tU&loadFrom=DocumentDeeplink&ts=43.71)):

Thank you for inviting me to your incredible ship. Could you tell me the name of this incredible spaceship that we're standing in right now?

Sonya Dyer ([00:54](https://www.rev.com/transcript-editor/Edit?token=A1jaL9DIG7i6yRmuVbHaxc_LA7c2OOAniNbqlM_es9uViVt12IcU3ChnNRq4uPtjcVC-eC17wIvVK0o8OIZwSfuKLms&loadFrom=DocumentDeeplink&ts=54.81)):

So we are in Anarcha, the second Anarcha, Anarcha II, one of three ships that we're building as part of this mission. They named Anarcha, Betsey, and Lucy. They're named after three women who were amongst many women who were experimented on by this guy called J. Marion Sims. He was a physician and gynaecologist in the United States in the 19th century and he sometimes referred to as the father of modern gynaecology, although it's debatable whether he invented anything, but what he did do is he basically tortured enslaved women. And so Anarcha, Betsey, and Lucy are three of the women we know of and so I've named the ships after each of them to remember them in a different way, and also to remember them in a way that is liberating and looking to the future as opposed to being something that's objected.

Weyland McKenzie-Witter ([01:56](https://www.rev.com/transcript-editor/Edit?token=GJBsT2ak1BmzDZq-R94VgV8u-12cQQ9TxQoShj_hBbFSaCoyRqgLJGe2hfPlZ9YfF93OG9tPU8Ag3SXeDROJqlvBweY&loadFrom=DocumentDeeplink&ts=116.7)):

Okay. That is nice to hear. I personally have never been to space before. I've dreamed about it, I've tried some things that people said would take me to space, but it's my first time and we're looking at this incredible ... I'm not sure, is this a galaxy? It's bright, it's...?

Sonya Dyer ([02:13](https://www.rev.com/transcript-editor/Edit?token=ckjAvL26nootsTJjioDV74zXcv-b8UTgU_7nqTd7Fs11eH2PSyqdMqBdNXpzfdDOz_47Fpi-BYUPBPaRSD3ub2uqdU0&loadFrom=DocumentDeeplink&ts=133.68)):

So we're in Andromeda galaxy, which is between 3.3 and 3.5 million light years away from earth, so it's far away. It's named after Andromeda from Greek mythology, who was the daughter of the King and Queen of Ethiopia and whose beauty was proclaimed to be greater than the Greek gods, which of course angered the Greek gods. And so they, in the mythology, smited Ethiopia, kidnapped Andromeda, changed her to a rock, and sent a monster after her, a sea creature. And in mythology, Perseus comes and rescues her. It's basically the first heterosexual romance within Greek mythology. And then Andromeda and Perseus go off and have a family. Andromeda's interesting because there's a galaxy and a constellation named after her, and her parents are up there as well, as is Perseus. So we're in this family of Andromeda-related constellations.

Weyland McKenzie-Witter ([03:19](https://www.rev.com/transcript-editor/Edit?token=nTy2gDIj2Zfasulvn-xX9oJRvaC5Durrd9Z9Y5XIy-A09h_R20cZH34a4u62qbvU_oV2Z_IERzjuTLq1uTUZgMOiJZU&loadFrom=DocumentDeeplink&ts=199.26)):

And you said Andromeda is from Ethiopia. I've seen a lot of Greek mythological films and I don't really remember seeing any Ethiopians in that. What's going on there?

Sonya Dyer ([03:33](https://www.rev.com/transcript-editor/Edit?token=rqTlAGxLESCTy4_YAdvCLmRuFg6tKw8v8Zv242ZvIIQ1f0XEqNsMfBvM63hk1LB0uUQmclSkV7T7_gk_YKiYWnG8idk&loadFrom=DocumentDeeplink&ts=213.51)):

Well, that's the question, what's going on there? Because even people like Ovid refer to her as Ethiopian. And within the ancient Greek world, Ethiopia could mean what we now refer as Ethiopia, east Africa, or it could mean the African continent more generally, but it definitely denoted Africa. It wasn't like Ethiopia used to mean, I don't know, Spain or something. So there's been some academic research, and I write about this in my PhD thesis as well, into how Andromeda was described in the mythology and it's undoubted that she was described as a black woman, as a Ethiopian. But something happened within Western art history where paintings, particularly historical paintings, always depicted her as being European, usually blonde European, but it never changed her origins, she's still the Ethiopian princess, but just mysteriously blonde.

Weyland McKenzie-Witter ([04:47](https://www.rev.com/transcript-editor/Edit?token=20zcNblIvTZy3Buadz7DGuG6m3RvdOntXFtKKAxh4t1p-pkeVuQVt4tCWvqYUcywzm5fPbi56jWXDKTvOl7FlXIgCmI&loadFrom=DocumentDeeplink&ts=287.34)):

She's the only white in Ethiopia.

Sonya Dyer ([04:48](https://www.rev.com/transcript-editor/Edit?token=o6ysAlFKNu59EqjSr5Bn3lvDjMyyt5ov_RQoeWfX3OignEcPY5zjLyy2eDRogkYIs1lg4x3gb0AZtCoZOgGn2525q2c&loadFrom=DocumentDeeplink&ts=288.51)):

Yeah, for some magical reason. It's more contemporary artists like Kimathi Donkor, the painter who's painted an African Andromeda, I think actually based on his wife. So now, we're seeing more Andromedas, but in all the great Sunday afternoon movies that you used to watch of Greek mythology or the Ray Harryhausen animation and stuff, it's always a white, usually blonde woman playing her.

Weyland McKenzie-Witter ([05:17](https://www.rev.com/transcript-editor/Edit?token=gBdkw5Iev8Ry15MOqaztcSBBHiReN1B3FDY6IEAUdeoLzYzK76a-HEqM29gnRt3aA2JsfViI4Bf383GdgDXDAqaxJXU&loadFrom=DocumentDeeplink&ts=317.4)):

I think what underpins a lot of that is that idea that some people, they get to decide on what the canon is on what is the official story. And it seems to me like a lot of your work picks and questions that canon. So as well as being the incredible captain of this fleet of ships, you're also an artist, so could you tell me a bit about your practise?

Sonya Dyer ([05:50](https://www.rev.com/transcript-editor/Edit?token=Z6heCo_2q-S5r-eufiWKF0ebpuSqsC80nfi6eW6x9ZidsyUiXeghB65FeL862KIqQ-KLXFg3E9odm-ZNbB40Pci3bVs&loadFrom=DocumentDeeplink&ts=350.1)):

Sure. So my practise has taken different forms over the years. I think now, I would say that I mainly make moving image works and sculptural works, and there's always a strong informative text and writing in the work as well. In the past, I've done things like performative lectures or projects that involved working with people more broadly, but this seems to be a natural place for me to land. And my ongoing project is called Hailing Frequencies Open, which is a phrase, if you watch Star Trek, you've heard a lot in particular spoken by Nyota Uhura, played by Nichelle Nichols in the original series. And in many episodes, it would be her only line of dialogue. She wouldn't really get much else to do in an episode. And if you read Nichelle Nichols' biography, she talks about the racism that she experienced and just how she had to fight for everything.

Sonya Dyer ([06:51](https://www.rev.com/transcript-editor/Edit?token=ycqlNOIH1KBvDtpgubdLLk5Gv6stHOcOkEgdywmjsJYUDc4FI4RbvqWb6OIoFf0KLbrFvA9bJJ7lgxy5HdXhrBjbiw8&loadFrom=DocumentDeeplink&ts=411.06)):

Most famously, there was a point where she wanted to leave the show and Dr. Martin Luther King Jr actually convinced her to stay and just said, "You have no idea how important what you're doing is, not only for us to see us in the future, but for everybody else as well." But Nichelle Nichols is also a really interesting character because she was involved in NASA on various boards and committees, really utilising her status within pop culture to work with the actual space agency, and through her company, Women in Motion Incorporated, she actually created this programme where she went around the United States recruiting astronaut candidates from so-called non-traditional backgrounds, because astronauts used to be white male fighter pilots. And so the first American woman in space, Sally Ride, came through Nichelle Nichols' programme, the first black man in space came through her programme.

Sonya Dyer ([07:46](https://www.rev.com/transcript-editor/Edit?token=JoExvdUJxKx0D1js6NotAGnJvTmNWWv8sLuLejUfLplWYd1ZOnsXTo9R55pql1BIMZ6DidMnzrSjbtUlLRP6fFIwaj4&loadFrom=DocumentDeeplink&ts=466.35)):

So she really revolutionised space travel so I see her as a very important intellectual component of my research into this project, and also as a progenitor of a type of space travel, and also of black women being in the future within the popular imagination. So it's her, it's Andromeda, and also the story of HeLa cells. So HeLa cells were taken from a woman called Henrietta Lacks, HeLa. Basically Ms. Lacks had a very aggressive form of ovarian cancer and she had cells that were basically immortal. They reproduce at a rate that scientists hadn't seen before nor have they seen since, and they can reproduce onto any circumstances. You can put some on this table here and they'll just start reproducing. They don't require any kind of stimulation.

Sonya Dyer ([08:41](https://www.rev.com/transcript-editor/Edit?token=jH6bbsn4PNtIVQ-z7LCky3r4nmBmMSTcwYV0du8CadmwzxlMnqwQMaX4lUeOZDZYqoMHgNBqtOili413Hiq42T1WqvM&loadFrom=DocumentDeeplink&ts=521.64)):

And so there is some controversy over how aware she was of what would happen to her cells once they were removed from her body, but they were shared around the scientific community globally and have become the goal standard for biomedical research. So your cancer research, your age research, and so on is done using HeLa cells. And they've made billions, of course, for the biomedical sciences industry. But what particularly interests me is that they were the first human material sent into space. The Soviets sent them into space in 1960. So I posit that human space travel begins with HeLa, with Henrietta Lacks. She's the first of our species that was sent out into the stars. So space travel begins with a black woman's genetics, if you like, her cells, her building blocks. And so those are the three main influences that fueled the mythologies that I'm building for Hailing Frequencies Open as a project. That was a very long explanation.

Weyland McKenzie-Witter ([09:51](https://www.rev.com/transcript-editor/Edit?token=yPCYclH7ByFiPpAdmAoezss0m9-aEKyU4sMUxd_q4i9plgXUO9ShYJjh9FjnT1JJzQbx9BTKi6bPzzs34FtHbyzFzFY&loadFrom=DocumentDeeplink&ts=591.45)):

One thing that's coming to me, I guess, I think it might be by design, is there's that dichotomy of black people being subjects of science and subsequently science fiction, but a lot of the work that you're doing is making us, I guess, more so active participants in the creation in these science creations. Am I right in picking that up?

Sonya Dyer ([10:26](https://www.rev.com/transcript-editor/Edit?token=ftOelxJIqrO5fSSEyICv0lt2YQFrwixVfQtb3OH90WfZu5SmXe1r-58T7N23YJz_PFQ9s3nK_d2RIDXjaNMvnp44UFw&loadFrom=DocumentDeeplink&ts=626.94)):

Yeah, absolutely. Making us progenitors, making us a protagonist. In one of my videos, I make a series of videos based on conversations with black women scientists where I ask them about HeLa cells, and science fiction, all these things. And one conversation with Dr. Chanda Prescod-Weinstein, who's a brilliant theoretical astrophysicist, she talks about the relationship between scientific community and not only black bodies, but black people, and actually recognise that black bodies begin to people, and how it's understandable that there are often suspicions or hesitations when it comes to our encounters with the scientific community. You saw this around COVID as well. But in my work, I want to reimagine where the centre of narrative is located.

Sonya Dyer ([11:23](https://www.rev.com/transcript-editor/Edit?token=wk5QbuB5a5ji3mRoNujV9Xhht_8l3x_VO8VRh8Moqm1qY5O1z6gtYLTjvdxXWuQzhgxzYZ9cbJ1wXWMd9SBRuwtdRy0&loadFrom=DocumentDeeplink&ts=683.4)):

So for me, it's more than repairing something or correcting something because that's still responsive, it's actually just starting in a different place, starting in a place where these black women who are mythologized or "real people" who are also mythologized are actually where the story begins. Placing these women as where the story begins as opposed this endless battle to insert ourselves into things, which is very reactive and very disempowering, I think. Actually just making the decision that this is where it begins, that this is what I'm interested in. I'm building a mythology that is centred around subjectivities that are usually marginalised within not just speculative fiction but in the world we live in currently and more broadly as well.

Weyland McKenzie-Witter ([12:27](https://www.rev.com/transcript-editor/Edit?token=oaqivHKsasnEcmXWxw5W4128HJmZQenic783Svm-kZ8CAmPKSpxVKNOC3Yx3xlMdXdz6NjgNICbHKaNvNsbdeTje3SQ&loadFrom=DocumentDeeplink&ts=747.39)):

On the topic of myth building, the ships that you designed them, would you be able to describe for me the interior and describe, not only for me but for the listeners, the interior of the ship? What's going on? How's it running? What's the crew like? What is the day to day like on one of your fleets?

Sonya Dyer ([12:57](https://www.rev.com/transcript-editor/Edit?token=u9if8jQYJIT78IJiSd6kgvmXIjNqo10bmMv9niy8tMWdzNSFUG5goWq-zFRvrWGhCsQfstFThj3E7bCDsTDfEMx0wzM&loadFrom=DocumentDeeplink&ts=777.54)):

This is something I think about a lot and I have a lot of weird dreams about because these ships, the way that I imagine them, they're for HeLa cells, they're not actually for our corporal bodies. And I'm really influenced by people like Octavia Butler and the way in which she, in her writing, imagines not only aliens but what life might be and what form life might take. I read maybe a year ago, I've forgotten the detail so this may not be useful to you, but there's a sea creature that scientists presumed was dead matter, and only recently they realised that it was alive, it was just breathing so slowly that they hadn't register that it was alive.

Sonya Dyer ([13:47](https://www.rev.com/transcript-editor/Edit?token=CkoSKzsq2XWnK4MgWZEOWtoldiF6G5ibkDN6SWqi2xWWmAERtOTbEOiNgXV0m8jQJ0LVjctffkhOyVEzpmD0hD711gw&loadFrom=DocumentDeeplink&ts=827.04)):

And it's something that's come up also in my conversation with Jeff, who you're going to talk to later, about if aliens were looking for us, there's a lot of presumptions that scientists make about where they would look, but it's based on our understanding of things, not theirs. So I'm interested in building a ship that is for human materials but not for human bodies, and imagining the HeLa cells as sentient and as having motivation independent of what scientists might want them to do. And so their journey to Andromeda becomes a space of liberation for them. They can build their own societies. I made a work in 2020 called Kairos, which took the form of a group chat between HeLa cells. And with that, I was trying to work out the different conversations that would take place in a society that was forming itself. So what is it to reimagine how a space-faring society might organise itself? What is the anti-colonial way of exploring space and how might they then look upon us?

Sonya Dyer ([15:09](https://www.rev.com/transcript-editor/Edit?token=BBNhjPLka2zyWuqYHyd3tKUxf09p2oXobNvOCycSbPohHrH3OEIfY5WN0AWk5s8vy1ST5fdxv7YGjuTUwphyYVS_3yU&loadFrom=DocumentDeeplink&ts=909.66)):

So in my mind, the interior is not a space that you and I could live in, it's a space where cells can multiply and roam freely. Almost like a beehive where different types of bees have different jobs, I imagine different types of cells would have different jobs. So some would be navigational, some would be taking care of other elements, but that's what I imagine. But I had some really weird dreams about it, and actually in the third film, I would like to be able to enter into the interior. But just a really fluid space, almost an aquatic interior space that has more curves than corners and where communication isn't verbal. So I work with Morse code in the videos that I make, but I imagine things like communicating via light, via vibrations, again thinking about how a beehive might work as well. But just almost womb-like, I guess, but floating in space. That's the kind of stuff I think about.

Weyland McKenzie-Witter ([16:51](https://www.rev.com/transcript-editor/Edit?token=A5nSzZs9Yr3R6mbbnuqyMFV4sOO4bCjUoOL2xeL2euY6TGzCcho547TbBioPURv-FidhEuKaNMYaDUMIhm7Rniayi64&loadFrom=DocumentDeeplink&ts=1011.6)):

Okay. We're standing here looking at Andromeda. What happens when the HeLa cells reach Andromeda?

Sonya Dyer ([17:00](https://www.rev.com/transcript-editor/Edit?token=fn7YmhK5v3TfXq0XrnkdGFdHHDgN-75oW24CykZ2PFHR9MnlxbXvPJU0EIc_7JWqxVL58SttifBpD0sf9hbG0NlU8qQ&loadFrom=DocumentDeeplink&ts=1020.48)):

That's the question. So there's this sci-fi story, it became a short TV episode, called Cosmic Slop, where these aliens come and arrive in the United States, and demand all the black people. I forgot the name of the original story, I should look it up, but the TV show was called Cosmic Slop. And the conversation, the dramatic drive, if you like, of this episode is really about are these aliens pro or against us? Are these our friends?

Weyland McKenzie-Witter ([17:49](https://www.rev.com/transcript-editor/Edit?token=g0zGeHNUNJUHqzEYFMXXUS82z3vIzoNRPwORDa9JbqiaOqPXWWD0gB4dtSBVz888dH9yQJEAW_9C1yvUcnp5Zu9rVDs&loadFrom=DocumentDeeplink&ts=1069.2)):

Did they leave us here or are they coming to collect us for more inter-colonial space travel?

Sonya Dyer ([17:56](https://www.rev.com/transcript-editor/Edit?token=2RV3xsP6nE2Csf_6IqNzRcargeoGnY6-0gMpWO_oBWSw92hkHN3cOTjSRMFmCFmUXNngHQJ3gj_KxDC8pkyLt5tFfJ4&loadFrom=DocumentDeeplink&ts=1076.73)):

Right. The story is called The Space Traders. That's the original story.

Weyland McKenzie-Witter ([18:03](https://www.rev.com/transcript-editor/Edit?token=yDR9f7HVa-Qb-lLZ54O2PgR2Dpcwn5epbIXifTu-v6Qsb7bXg8mydGNp70AOo3BHLWkVJFPvGhTU8ISuOzyIrEazkQQ&loadFrom=DocumentDeeplink&ts=1083)):

The Space Traders.

Sonya Dyer ([18:06](https://www.rev.com/transcript-editor/Edit?token=rKcm76bQ6b7PfUy6GaeC5jc9ZrF4svIZkbjj9paOvqtbjdqtNZmcWyHVJrKAs6seGnPzrmrvuN10DknQidzREj60aI4&loadFrom=DocumentDeeplink&ts=1086.03)):

So I'm interested in that ambiguity and although there's a utopic part of my brain that thinks it's all going to be like Wakanda or something, but I'm interested in leaving that ambiguous, for now at least, and concentrating my energies much more on the possibilities of what it could be. I don't know whether I need to answer that question or whether I need to answer that question in this series of works. It might be something that happens afterwards.

Weyland McKenzie-Witter ([18:50](https://www.rev.com/transcript-editor/Edit?token=5l7OkzVXNaQHeqgkRFyhJ34CLXcaDwkBfmzyvlSWuJP8KnciMs833Di-p0898X1BlywQsAoU9N21nNV08m5jEfxwPh8&loadFrom=DocumentDeeplink&ts=1130.34)):

Could you tell me a bit about Cosmic Wonder? If I say the words Cosmic Wonder, what does that mean to you?

Sonya Dyer ([19:02](https://www.rev.com/transcript-editor/Edit?token=kJle-0UDiQScOWSI8HPlOLtKnmbYk3z7siU4urWPyMMQJeoJuVmCIuNQPkSAsVbftu2xAYzZvPD1JkmBuZLpnIMkppI&loadFrom=DocumentDeeplink&ts=1142.76)):

Cosmic wonder is a project that I'm doing with Dr. Jeffrey Grube and his students at King's College, and it's part of a collaboration between King's College and Somerset House. So we got together and put together a joint application and were fortunate enough to get the support. And they are building a telescope which has the capacity, we think, to look out into the stars and potentially to look for what else might be out there in terms of different forms of life. And so I'm really interested, for me it's fascinating to be in conversation with scientists. I don't understand most of what they're saying but I like that, I like learning from them.

Sonya Dyer ([19:52](https://www.rev.com/transcript-editor/Edit?token=Seu8EQQpWIpzeY-Av2QJF80BdGA9tHYixw8gIqkWlFOU8Co0IUX1iwts3KmJLjrO7R13eTyDElQ8Y2t46yYXZFqh_1g&loadFrom=DocumentDeeplink&ts=1192.95)):

Part of the project is really working with them and recording bits of their journey, which will feed into my next film but also be a standalone thing. Also, I'm really interested in space instruments, in things like telescopes, in the labour that goes behind building these things in relation to artistic labour, and just these correlations and relationships between the ways that I work and the ways that they work. And they're a really interesting bunch of students because they're from different cultures, different backgrounds, and so they're bringing a range of cultural perspectives on what is out there as well as their scientific knowledge that they're developing.

Weyland McKenzie-Witter ([20:48](https://www.rev.com/transcript-editor/Edit?token=szy-HkKnaU_duQf0dt5Gm6_xAqqopDVBN715Zi0kphinfuWL1GIwwhs2dQq3hCGCYdaFzTFS0ZkmJLJXXdzDkT6vqRA&loadFrom=DocumentDeeplink&ts=1248.51)):

I'm going to need you to drop me from we're in Andromeda, we're by Andromeda right now. Could you drop me back off to King's, go see Jeff and a couple of the students?

Sonya Dyer ([21:02](https://www.rev.com/transcript-editor/Edit?token=BHh9TEBFIiGuLEfQlUMugF5RnUA7Mpxvs7U76MZmXTZEG46lbyKnQTZws9ykPUUQQQPPI9Swpie_1fmYaHfRFkIR9Ac&loadFrom=DocumentDeeplink&ts=1262.43)):

Okay, it's going to take 3.5 million light years, but we can have some kind of warp speed situation. We can get you there in 10 minutes.

Weyland McKenzie-Witter ([21:11](https://www.rev.com/transcript-editor/Edit?token=ZbRT_f0Ww0r6BMXiSG65QK1ImlE0QsOAiNFkOnBzuOb3GcWuRjklU5sQD0s0dJwTjhCf10J7g9DKh3_NwVseRb4P6eM&loadFrom=DocumentDeeplink&ts=1271.76)):

We're going to enter HeLa space where things move differently.

Sonya Dyer ([21:14](https://www.rev.com/transcript-editor/Edit?token=zVy9VWu1Q_9CmzlED6_NeWJNRtMx7XV0TDVemGGz4alO5qg7knTE5rMD1i0_ExnYx622K7A1ZG6GWdkHVTVTpjGQqQ0&loadFrom=DocumentDeeplink&ts=1274.88)):

Exactly. What is time?

Weyland McKenzie-Witter ([21:16](https://www.rev.com/transcript-editor/Edit?token=_pQSqpJiGwjenyivccs0WC1EchMUF7UqaP37BOoin0GJ4wc86bi2C7Ibp316maisn1g7z4RlFK8swLlgid4wU8gyrSI&loadFrom=DocumentDeeplink&ts=1276.77)):

Nothing.

William Eagleham ([21:31](https://www.rev.com/transcript-editor/Edit?token=6CllZbolFBwmhOweGCeC-Req7SYhHNRxXGB0TS2xBKG29HV_-pwR7dSFFXzjCbOFDcTyso5rsQJIg_KgwcfnebWLk54&loadFrom=DocumentDeeplink&ts=1291.95)):

So my name is William Eagleham, I'm a third year physics student at King's College London. We're currently standing in I think the smallest official lab space at King's. This is where we've spent the last five weeks building, or building as much as we can, of our radio telescope. This thing here. Radio is 2.3 metres. The original idea was that we were going to try and observe the movement of the Milky Way. We've had to readjust slightly, refocus, but I think, considering the time we've had, we've done quite well with this.

Adit ([22:00](https://www.rev.com/transcript-editor/Edit?token=oNeGdNCS0QNXy5wodbRiXLKICAzbk5L4Oq2AthbAl7wmqWxeF-e_2YQ1kkBsLsAbkUPg451O1EQ7WEEAGSvD_xeb8VQ&loadFrom=DocumentDeeplink&ts=1320.69)):

Yeah. I'm Adit [inaudible 00:22:02], I'm also a third year student. I'm doing physics with astrophysics at King's. And just to add on what Will said, we've made quite a lot of progress. Unfortunately, the last few things that are left are just being able to connect a device to it, and then fixing it up on a tripod, and being able to take readings and stuff. But I mean given the time constraint, and the problems with the admin and the estate's people, we've done a considerably good job.

William Eagleham ([22:30](https://www.rev.com/transcript-editor/Edit?token=qiSFe-qTRbAP9ien0YHFVVe2jDD4MIkEWDk623PeS7B2FOcu4-mjqcqVZlUMGSnFhvjzTqOJfmrICN5MMPmTmB8Gr2Y&loadFrom=DocumentDeeplink&ts=1350.63)):

Yeah, I'm happy with what we've done so far.

Weyland McKenzie-Witter ([22:33](https://www.rev.com/transcript-editor/Edit?token=0LYfXc25jGyrkBrjKgmtmYH09g6bZFvF3YDzLwFBMYRC2ZHXBaMeXGgYXDidShcC7-XzCU6EyKuEKU3TZcutEJoY51Y&loadFrom=DocumentDeeplink&ts=1353.18)):

I'm not a physics person. I didn't like physics in school. Could you explain exactly what's going on here? To me, this looks like a giant spider web.

Adit ([22:43](https://www.rev.com/transcript-editor/Edit?token=APO4XroUskGgKqXqmr7-u6vwgZB3D-4j1hYrESuaG4GxOYmxrdyzD223cKFjlgc-XPYUydgpPP8X9hds6jzOmqa32W4&loadFrom=DocumentDeeplink&ts=1363.8)):

A giant wok.

William Eagleham ([22:44](https://www.rev.com/transcript-editor/Edit?token=mRHn8Qa7aqcqHW4pxQyzl57b7lXIFOmGgwuU_8GF5uqDoDP8VfdqH4GdsvLTKOP6HRjVsucnSElqQqSU2-aQzxs8IFc&loadFrom=DocumentDeeplink&ts=1364.31)):

That's one of the comments that I've had.

Weyland McKenzie-Witter ([22:48](https://www.rev.com/transcript-editor/Edit?token=VzD-oCMBJgX11mHPHcpf-rlUhJuiuj9HXCIaf3PfBj9UiG6_QZT75R7w8jEstlyQTmWpgW1bNit04CfuLaOaqfTRocM&loadFrom=DocumentDeeplink&ts=1368.63)):

Yeah, a spider web, wok.

Adit ([22:49](https://www.rev.com/transcript-editor/Edit?token=i7BoiRxj87K3TYBPITc6EZOQp9xs2f_HHBsTCqPX1XKedWT-Z3CVD5Dos5WtrFebRXcS1NQ6n8lG2wbF3zNZu6Bp9As&loadFrom=DocumentDeeplink&ts=1369)):

Death Ray?

Weyland McKenzie-Witter ([22:49](https://www.rev.com/transcript-editor/Edit?token=-eoErB9nkvgNddr5fBI3nE-F407TREncerV4ltFQwggLG1G2e1l-bFjdd-TANKMtnSmPUY94DIORN9RNUiOPFg0wwE0&loadFrom=DocumentDeeplink&ts=1369)):

Death ray.

William Eagleham ([22:49](https://www.rev.com/transcript-editor/Edit?token=g-Y6FiXdy3qq4NEs_3qtOl292BBaLp6-ump-aoB3_npovUuJMxSVRyH8rsfBWFpNuOPvvAZ4QIagIQod_N21TQYQNtA&loadFrom=DocumentDeeplink&ts=1369.02)):

Death ray. I've had death ray. That's my personal favourite

Weyland McKenzie-Witter ([22:51](https://www.rev.com/transcript-editor/Edit?token=bDJyacdlEyJl3yoIVvFNSF5Z56ejuZGEzQYrfYJNaWgX3-smdLqODccNK90Rx7dlU_KW1SSsCUlikmCDMl0JRhtI2Z4&loadFrom=DocumentDeeplink&ts=1371.72)):

Sometimes you need a death ray, so I just want to make sure that you guys aren't building death rays or, if you are, that we remain friends.

William Eagleham ([22:59](https://www.rev.com/transcript-editor/Edit?token=3skZ2KX2boJPZX0zhnyFFQnjJac3gt3rlF5QbrWdgmgIi_8WVrr2gIMNtsH3J6y7TOVrZC9EvT4_f26jCgTWHHcV120&loadFrom=DocumentDeeplink&ts=1379.04)):

You remain friends.

Weyland McKenzie-Witter ([22:59](https://www.rev.com/transcript-editor/Edit?token=EYnpl09m_18WrzqQ9TxOKOyuZsnqlKRNgwp5hJYRPq8VlQJetYZ27hYVhYc_X7HLZGw1krNC7eYF0_T9NYKi2eqMwTg&loadFrom=DocumentDeeplink&ts=1379.04)):

Exactly.

William Eagleham ([23:00](https://www.rev.com/transcript-editor/Edit?token=fuUQDVk2rrRz7fbJ6x9xyUWaFNZLqaxh9eQw-k-kp0RIktEKPoeFDQmeTGW92QIZ_jzRTchKSR5qosdnIQxErObWoxA&loadFrom=DocumentDeeplink&ts=1380.54)):

You are behind the death rate, you're not on the receiving end, don't worry. So do you want to start or shall I?

Adit ([23:07](https://www.rev.com/transcript-editor/Edit?token=Uc0dH9yotUP0DqB4KI4Tv84cTFjODBj0nl-IWlm5lIOo5FBsNc9T5W3JExn9eFHA5ZoXQhstVLnvjR_a3oEOvJfuCOk&loadFrom=DocumentDeeplink&ts=1387.38)):

Go for it. I'll take over after.

William Eagleham ([23:08](https://www.rev.com/transcript-editor/Edit?token=lh736DKJxslaoWALGPz8da58Gw43PG45YHz6s_GnYYSlfDEg9cHa5Ryf1E69Sop1UdsUkMmjSZbIj7Iav8atXqh_Ypw&loadFrom=DocumentDeeplink&ts=1388.82)):

So it's a radio telescope specifically, so we're observing in the radio part of the electromagnetic spectrum. That's all of the electromagnetic radiation that we can see. So the light that you get from the sun, the light that comes out of your screens, that is a small sliver of a much wider electromagnetic spectrum. Radio waves, the same type that you get in a car shortwave radio, except in this case, we are looking up at the sky specifically. So the reason for this specific shape, the reason that you see most large telescopes as circular, slightly concave objects, is that this is the catchment area for the radio waves. What's going to happen is radio waves are going to come down, they're going to hit this mesh and, because of the shape of the telescope, because it is curving upwards, no matter where they hit, they will all be redirected up to a point, about I think it was 1.08 metres.

Adit ([23:57](https://www.rev.com/transcript-editor/Edit?token=edc4dWZSDwsWvZpvPTJjXsapWngpeeYHWZsIev9XYv8ydVCG27ow9_PXuinDcSFg6wbTIS9kkssaxKnYVfdOxJQQLio&loadFrom=DocumentDeeplink&ts=1437.36)):

1.08 metres.

William Eagleham ([23:59](https://www.rev.com/transcript-editor/Edit?token=h2-mI5usKdzjB6aYcqNJJN1AlgNS4BDiv6gjFs-49sCsn7R5ljIDesMoEXzVgCUz9IvwfIWTCfkE3ni0TjmdjfHqKXU&loadFrom=DocumentDeeplink&ts=1439.31)):

1.08 metres, you see, I remembered, above the centre of the telescope, which is where the transmitter is.

Adit ([24:03](https://www.rev.com/transcript-editor/Edit?token=x5A7oVlyfWV9bj_OTDli8lsMZZfLu0wmLXp4VHvXCc7--RJ3wAXbbKqsY7aWDePKo9-93digl9foDn5vlFTjS9eQ7hA&loadFrom=DocumentDeeplink&ts=1443.12)):

Which is about-

William Eagleham ([24:04](https://www.rev.com/transcript-editor/Edit?token=WdMBKf3_D4kk208mqrpsQhQx8dHu_pxzQEHrlQAFmQvWgeWTZVnbwtsTjN96euV9qs9glr1eYNNsGQt9D8wLFyyCoF8&loadFrom=DocumentDeeplink&ts=1444.62)):

Yeah, about here-ish. And our transmitter is around here somewhere. It's a very unassuming little brown round thing that cost about 50 quid. So we plug that in and then all of the radio waves coming down from the sky hitting this area will all get focused into this transmitter.

Adit ([24:22](https://www.rev.com/transcript-editor/Edit?token=O1Z02d8kEYmXJwvOwyWPJ9IJb5WoZvRgsce2LR_Odq6fELdM6uLKPG-rnuiXCOyQYtLHjJIFOAIzhpXd_yvU114uZMQ&loadFrom=DocumentDeeplink&ts=1462.44)):

Yeah. Just to add onto that, the reason why we're doing the radio waves in specific is that all other wavelengths which are smaller, relatively, tend to get distorted because of a large dense object in the sky just blocking them. Could be gas clouds, could be a planet, could be a solar system, could be anything. Because of that, a lot of the visible light does not really travel through because it tends to get obstructed, then a lot of other smaller wavelengths as well. Radio waves are known as one of the most reliable sources in that context because that wavelength is so big that they usually tend to just pass through and most commonly it makes it very easy to just study everything in that spectrum, just because of the fact that it's not really that distorted and it can easily be fixed with a little bit of math, mostly math that you can even do by hand.

Weyland McKenzie-Witter ([25:15](https://www.rev.com/transcript-editor/Edit?token=P0PHng-q85jmQYVObCgcVhpFOJLVozO3D1YI063pFpIqYN-kw3nEmlVcuPpvdCyByfSKcA_E6j_pZ9YWKuf74NexeUs&loadFrom=DocumentDeeplink&ts=1515.03)):

Yeah, math that I could do by hand.

Adit ([25:17](https://www.rev.com/transcript-editor/Edit?token=bvKp89EUTN1coxwCOmf3CrX7cD5hJ0Kldh05MY42DB_M9x1-RePdYAZ8IjYUG9RFO90fkn1f2iRF9ZT6WnSYo7ecB28&loadFrom=DocumentDeeplink&ts=1517.22)):

I mean it starts with a lot of trigonometry.

Weyland McKenzie-Witter ([25:19](https://www.rev.com/transcript-editor/Edit?token=2Zm9znFyD2DgorJTS1lfG5NkAXEGKpqTZ9jTn2LDK11MH1M8aIj9gFUXxkEF7y_IrNLXf6DZgSJj1b-NAMk1xZlLghs&loadFrom=DocumentDeeplink&ts=1519.14)):

So I can't do it by hand. What is it specifically that you guys enjoy about the creation of telescopes?

Adit ([25:29](https://www.rev.com/transcript-editor/Edit?token=m6WBkhCHmaC289cCNarGMsJnHiBfLz_uvI6Su2T7Zj9DPeIHO71duXMANEEfeSrFZA7u6ykp0GztY_OnqclUnbp31VQ&loadFrom=DocumentDeeplink&ts=1529.64)):

Right. I mean one of the biggest fascinations as an astronomer and anybody who wants to go into astrophysics is the ability to see something in the sky. The fact that you're making something from ground up, I personally feel that physics is art, and the very fact that you're making it from scratch, assembling everything right from the centre all the way out to the mesh, putting everything together, writing a little bit of code, and then actually having an image or a spectrum on the screen that you can say confidently this is our galaxy or this is some part of our galaxy is the same feeling that I feel an artist would get when they finish a painting.

Adit ([26:07](https://www.rev.com/transcript-editor/Edit?token=CfOuzpop2-RSEL_cxBE_QbJMmSIh19ieRaHrn5QNxa0R9M1kCBGY1MLdv8ANfNCyzAazVl7S07wFIa4OTKL3giGgVSU&loadFrom=DocumentDeeplink&ts=1567.32)):

Because the end goal for this is to actually map the Milky Way in the radio spectrum, so the fact that if we can see the Milky Way and we can say 100% that from scratch to this point is just seven, eight of us in the group who've done this thing, and this is our art out there. And if it does help in any of the science, that's what the fascination of making a telescope comes from. The fact that you're behind the thing that's given rise to the particular thing that you see, the set of data or whatever you see, on the computer screen.

Weyland McKenzie-Witter ([26:46](https://www.rev.com/transcript-editor/Edit?token=-i2cwuJ9DxQKlLjaF1wrDWB5LtVB29tclVFA5YRc58MEJaWhWyrfy0spHyza7SANwNh2sjJetbtMJdMVPqInrzqTgj0&loadFrom=DocumentDeeplink&ts=1606.11)):

Jeff.

Dr. Jeff Grube ([26:46](https://www.rev.com/transcript-editor/Edit?token=vVUf5biJTvbk0a1KnEXs5u2dWZBRHgesThvlDB48FflOXE-HPGo8dTXeKvRdV302e5EBT5Gd50idOD9HG4_ukaIelwo&loadFrom=DocumentDeeplink&ts=1606.26)):

Yes, hi.

Weyland McKenzie-Witter ([26:47](https://www.rev.com/transcript-editor/Edit?token=rWGNg-ssL4dRdXHtlTT03cWAPyODmJdNuq9_7aIWPefHjv-HwYxFQ9jiTz4HO3rlUfA9TW5EFnKsUDO93o785afKTW0&loadFrom=DocumentDeeplink&ts=1607.07)):

Nice to see you.

Dr. Jeff Grube ([26:47](https://www.rev.com/transcript-editor/Edit?token=_UnDgA0S409_nUNahlDuqg-ANXzu-uFklUTfvrWvz955DUFHaEB4opCeTBrDELGCwqM-L0pZioQhq_1s73Th7yOBw2U&loadFrom=DocumentDeeplink&ts=1607.91)):

Good to see you too. I'm Dr. Jeff Grube. I teach here mostly, but I also have a background in research in high energy astrophysics, so looking at light, which is much higher energy than we can see, so even beyond x-rays to gamma rays, and this is what we would think of as dangerous radiation that really does cause mutations in our body. But luckily we're protected from most of that when it comes from space because of our atmosphere. So our atmosphere protects us. And this is what I did my PhD in, building larger telescopes, so about 12 metre diameter, out in the desert of Arizona. And it's a new type of astronomy, only really was successful since the 1990s, so that's also quite cool.

Dr. Jeff Grube ([27:33](https://www.rev.com/transcript-editor/Edit?token=IexZLt8-5TNkfu33G1fwsdY0pnVKHf8Z_1A4rXYhbnCeyQ9TPABvubq3x85IFt__6SLPeLd2pSSxydssYx4o2ISJGlY&loadFrom=DocumentDeeplink&ts=1653.69)):

It's on the other extreme from this radio telescope because, again, these are very long wavelengths where we're talking about 21 centimetres. So it's cool, you can look on a ruler and figure out how long this wavelength is. Which, as Will or Adit may have already mentioned, means that we can use this mesh dish. But for the other telescope I used, it's clever because I said that the atmosphere protects it, so we're actually trying to look at what happened when the atmosphere protected us from this dangerous gamma ray radiation and how that eventually reaches Earth. So anyways, that's a long-winded version of my research background, but King's, I'm really happy to work with students and teach a few modules in astronomy, and it's been fun.

Weyland McKenzie-Witter ([28:21](https://www.rev.com/transcript-editor/Edit?token=2mnxGi1X5tegTGSMzCDGlMwsy8uo15y971ENEoRXYLRE_6ellIhxzbwVrM8qHehaq4PWvwlHPwkfhJnwg805KNuoud4&loadFrom=DocumentDeeplink&ts=1701.09)):

What was your introduction to project Cosmic Wonder?

Dr. Jeff Grube ([28:24](https://www.rev.com/transcript-editor/Edit?token=htcsWvw9ItNnr_Pv5y---2OFIqm8EA9gX2kgsjM1BriL8-1ZmW5olH6MYEsRsBxdpEMmQqhVJbqpTQPu8VgRuOmsboI&loadFrom=DocumentDeeplink&ts=1704.27)):

So my introduction is Sonya and she's great, I really love her vision for the project, and it made sense to me to combine this with our project in radio astronomy. The two came together really well is her vision of space exploration, the way that it relates to different identities and different ways of understanding the cosmos. And then, as we've heard already, the way that we can personally make that connection through our labour, through technology, through getting small injuries on our hands from wire mesh, and actually the process involved hopefully connects us to this larger cosmos.

Weyland McKenzie-Witter ([29:16](https://www.rev.com/transcript-editor/Edit?token=T-dPGS1-pSKmS6TuTEi2HVGTBNAqqoID9RQJvAKEox6q7tKStPuRhcAB4Am8TlkaCWu1IPLkfSO1895V0gucoz99zhk&loadFrom=DocumentDeeplink&ts=1756.59)):

What is the next frontier of astronomy?

Dr. Jeff Grube ([29:22](https://www.rev.com/transcript-editor/Edit?token=zaJH50ipDI-G2AIzDslNqMoor1RY9WROaB9IlOzv5DiilmNfWgYD2RwGdnZ4I4N0iBOKjszDbcZ-szBgzPSw2OSWQHk&loadFrom=DocumentDeeplink&ts=1762.98)):

That's a very good question. I just finished teaching a first year astronomy module and it ended the semester at the beginning of the universe. We went all the way back to the big bang and there's still quite a lot that we can do. So trying to understand the early universe cosmology and then linking that to what we're doing here. One of the things that you can do with these type of telescopes is look for dark matter and you can make connections on the nearby scale, so in our own galaxy or Andromeda, other nearby galaxies, and then go even a bit further out to other more distant galaxies.

Dr. Jeff Grube ([30:02](https://www.rev.com/transcript-editor/Edit?token=fyG-9IujDF37AC3eWRjnTcKMpUCyvWNnXsygw-96cVK0q9tcC-lIF0S0aDMv0J8bFli1y1tY7ECtVt-5Sz2GTBwzmV8&loadFrom=DocumentDeeplink&ts=1802.31)):

And so that's still relatively a small part of the universe, that's our local universe, but then we have the very far distant universe, which has expanded out from the big bang, and trying to connect those two. I think really the future of astronomy is that connection, is we keep expanding our knowledge. It's a very complicated universe we live in, all of the details, the wonderful complexity of galaxies and star systems, but then trying to connect that to the big cosmological picture and things that we don't know about. We don't know about dark matter. What is dark matter? It should exist, but we don't know what it is, and so these type of connections are really interesting between different types of astronomy.

Weyland McKenzie-Witter ([30:48](https://www.rev.com/transcript-editor/Edit?token=hSZKFP9MN_ikaKRivhQLXR7wUiQl7iYeZJXZmzaxJ2nfmuJ-_NI9yu1P__mCiwEk9z8tIaa2Ici9X50cZyVhZc_r-zw&loadFrom=DocumentDeeplink&ts=1848.69)):

What are some of the ethical considerations in looking into space?

Dr. Jeff Grube ([30:56](https://www.rev.com/transcript-editor/Edit?token=Jl3K63yCg4k_7jGqxH0-emlrYy1qcZ9k76LySDHgUFf83QYPbubBCrWqEoOx8dDNYNKnQNEaMTcT0-Q7J0k14S9ozoo&loadFrom=DocumentDeeplink&ts=1856.04)):

Very good question. I'm curious to hear your views. I think people can look at this from many different angles. One of them is openness. So one of the reasons I like teaching is that you build on knowledge and some of these tools might seem very technical and just really boring, but once you start to build on some of these blocks, then anyone can go out and download NASA's data and their taxpayer money, they can see the return on that. If they want to really study what professional astronomers do, they can do it as well. There's that type of involvement, there's also citizen science projects where people can do look at different images of galaxies and they can really help do the astronomy, classify these galaxies. Zooniverse is a name of one of these websites where you can get involved.

Dr. Jeff Grube ([31:50](https://www.rev.com/transcript-editor/Edit?token=sa81sNJx0y5rnROFjBXvn0BKud2Kqa-1Tanv0Xm5qUlGLA2IsySqc_IcHBP2JsGxBj32j_fFUBkjKwtfBSmdp8YxECA&loadFrom=DocumentDeeplink&ts=1910.76)):

And so I think part of the ethics is making it not just the reserve of some privileged professional elite, but really trying to open it up. There's also, of course, green astronomy, making sure that we don't destroy the earth when we're in the process of doing astronomy. And actually, it's not too bad. One of the main problems is that astronomers like to travel, so maybe the pandemic has helped me do less travelling. And just the way that you interact with your colleagues, so openness and making sure that the opportunities are available, again that's changed a huge amount. I'm now in my early 40s and I've seen the difference, as I mentioned with my PhD students and when I was a younger student, just seeing the field become more diverse and more open is really exciting.

Adit ([32:46](https://www.rev.com/transcript-editor/Edit?token=jG731nFVOTT71kHSdCpP1Y5VMhJoboIEOKJZuzJv16VZ7iWVWjbB-ApWMuVU27z88qAX5AFFNajOzPsALrud0pHIo3o&loadFrom=DocumentDeeplink&ts=1966.68)):

Yes. As scientists, you do have a social responsibility, not just because you're using money that's, in big projects, usually taxpayers money, but also generally because you do have the ability to make something that can potentially ... because at the end of the day, something like the atomic bomb itself was a work of science as well, so that is a side, so you have to be very careful with what you're doing. But in terms of astronomy specifically, I do feel like Dr. Grube mentioned that people can be involved and actually see where the taxpayer's money is going. I feel that not just that, but in addition to that, it's also one of those things where it allows people to understand that science is not as intimidating because if you're sitting at home and you can do the same thing, and you can get access to the same data that a scientist sitting in one of the best universities or best research labs in the world is, you do realise and you do tend to feel that it's going in the direction where people can get involved at any stage, pretty much.

Adit ([33:55](https://www.rev.com/transcript-editor/Edit?token=nj5EezAfWkVnES90SlxdzmSWTDWpzbjp6c_7m3E-XNSKkGe93PsxAU2KBc108NGhNo5w_8jahGvllUMCT5nzu5yatp8&loadFrom=DocumentDeeplink&ts=2035.86)):

It's no longer that science is something that's glorified and people studying science are elites, everybody can get involved sitting behind a computer screen. But I do agree, some of the things are problematic. I do like what some of the organisations are doing in terms of reusable rockets and stuff, because yes, that does allow for a lot less space debris, a lot less pollution, a lot less carbon emissions, et cetera, because I have been involved with a little bit of climate stuff recently, but I mean the nuclear explosions is definitely something that's a very concerning side and something where the moral obligation does come in of being a scientist, and trying to do good for society, and not causing harm in an attempt to constantly push science forward. Because sometimes it's better that you don't push it to the extreme and do 10% less as a scientist, because if that 10% less is saving the environment or saving the community 50% more or something like that, it's always better.

Weyland McKenzie-Witter ([35:06](https://www.rev.com/transcript-editor/Edit?token=CJjA3gSDK59Opc7i5yXPhvkzXXfb3AsS1uDd2MgpRrPnCLZ-b2oflwDJtYD8jSakXh3rl4863w-ZrnOTigjTGTOo6bY&loadFrom=DocumentDeeplink&ts=2106.57)):

Thank you for picking me up. You didn't need to. How much petrol money do I owe you? Gas prices are crazy on Earth, I can't think about it.

Sonya Dyer ([35:13](https://www.rev.com/transcript-editor/Edit?token=Hnuf7J9r094anLLZN8bodRrQq3zcx9dU-Kweqb-nPTVdnnzeS_TJh9fp739ETiXoL9ENTVyzVMOgb8Iz3WZxpdo21gc&loadFrom=DocumentDeeplink&ts=2113.86)):

Yeah, we're passed fossil fuels, we're not dealing with that.

Weyland McKenzie-Witter ([35:17](https://www.rev.com/transcript-editor/Edit?token=Mz8ZtdZ2uOi5OyYjnixh_ig9UCl6PMtxEDrwxBsdHkJhB97slUfsviwCi3q2yiD4irrsgFyPz_Jej9Mg1u7BX1ZDKRo&loadFrom=DocumentDeeplink&ts=2117.13)):

I would hope so. I guess the ship runs on just the power of the replicating HeLa cells.

Sonya Dyer ([35:24](https://www.rev.com/transcript-editor/Edit?token=0wW6khu6H15UxaKgzk_RMGLPeNhopUohA8i-d9c9q-CBedtW42tt35G3jeEIvA2Q3aRaXbkCygMjrkD99dhhc4nVrA4&loadFrom=DocumentDeeplink&ts=2124.06)):

It runs on the collective imaginative potential of the HeLa cells. It's the collective coming together that moves the ship.

Weyland McKenzie-Witter ([35:35](https://www.rev.com/transcript-editor/Edit?token=YpY3PutJgNk3ccoOA6RdyP5TC2Moj0v1wupXwlO0Ad0VV8BKBi-j5E5hwqrSc8K_9K5nd7TYz-TS9LGgIVHO3-2-Wl8&loadFrom=DocumentDeeplink&ts=2135.07)):

I like that. Could you tell me a bit about the concept of dark fecundity?

Sonya Dyer ([35:45](https://www.rev.com/transcript-editor/Edit?token=_Y_d-aia8lH086EFPF6HNog98S9IgeZGHXgtC9tjz8xJdRjw9-yaAW8NO_JBej1xUttBp3Ajz5C5mlQorI0JxD2KUFc&loadFrom=DocumentDeeplink&ts=2145.69)):

Thank you for that question. Yes, the idea of dark fecundity is something that I developed through my PhD and that is also powering my imagination in terms of how I think about this project and work moving forward. And it's really coming from a point of thinking about this idea of reproducibility and that hyper reproducibility, and the way in which HeLa cells in particular represent hyper-reproducibility, and how so much of the concept of race, as it is now used, because it wasn't always denoting skin colour, initially race was about class, in this country anyway, the way in which blackness, in particular black women, are associated with an out of control reproductive capability, which was something that was forced upon us doing enslavement and then is often used as a tool to-

Weyland McKenzie-Witter ([36:56](https://www.rev.com/transcript-editor/Edit?token=8nZV0eWVy1BpLIs771L4t0zLu4WWrHYpcX5Vv4QzuXMdIPgIlW21t89NPn19p1XSu28wieiWEtEHaOKPmNTb4ERJkcc&loadFrom=DocumentDeeplink&ts=2216.94)):

Pathologise.

Sonya Dyer ([36:59](https://www.rev.com/transcript-editor/Edit?token=6qafuwaptrJDqF9PkrZ-KaqoYUzfCaJI4_MCyZVqMznO2AIrEv45js6MwOIIKtHWx9beeDhjRoj0OF70ely0dfcdwb0&loadFrom=DocumentDeeplink&ts=2219.19)):

Yeah, pathologise us now. Whether it's to do with this idea that Africa is overpopulated, or this idea that immigrants or refugees will have too many kids, or I'm from Hackney, you're from Hackney, the myths around black mothers in places where we grew up. This idea that there is something out of control about darkness and then thinking about this framing of the African continent as the dark continent, and the way in which religiosity, in particular Christian thought, powered colonial endeavours, so this association with, for example, the biblical curse of blackness, all conspires to create this idea that something that is dark is inherently negative, inherently unknowable, uncontrollable, but needs to be controlled.

Sonya Dyer ([38:08](https://www.rev.com/transcript-editor/Edit?token=qqAhmMW_r4kJ8D5sQEjFap9-k4hKC8PZ133osqDSFuw9iq-IeQE7afoz6PA5YhLBHS20YtNRnz3QV9ryhwRLSfj3Lp4&loadFrom=DocumentDeeplink&ts=2288.46)):

And so whether it's a dark place or dark people, you see this in the caste system in India, for example, is always to be kept in a particular position in society, in the lower end of society. And so by thinking about the darkness of space and the vastness of space, and the fact that our planet is just one grain of sand in a whole field of rice in terms of the universe, I began to think what if we can reimagine darkness as a space of infinite creativity, infinite innovation, of infinite love? And what if that's what we were reproducing? So thinking back again to HeLa cells and the fact that they were the first material sent into space, what can we then imagine the endlessness of space and the endless reproducibility of these cells combining to create as an effective space.

Sonya Dyer ([39:15](https://www.rev.com/transcript-editor/Edit?token=Y0azsKsUd23PRBP1Dxk5xDOg-IHGJpoVZT-K2u4Sf8nwzeoggn0lGBJmMS0MBV7zVSrQus2PVIIvXDJLAzRNdJlbylA&loadFrom=DocumentDeeplink&ts=2355.81)):

And so for me, dark fecundity is a way of articulating a transformative generative creative space that blackness can occupy. That's probably the cleanest explanation that I have of it at the moment, but rethinking, reimagining darkness and thus blackness as a space of generative and generous creativity. I just want to open up a space where we can start to articulate and work through what happens when we get past responding to things or needing to recover from things. Not because I don't think that there are things we need to recover from but, as I say, just as an act, one of many acts that I'm sure many people are doing, to help us create this space where that is not our default position.

Weyland McKenzie-Witter ([40:34](https://www.rev.com/transcript-editor/Edit?token=9LcwWh9B6tIexhECQXtu0pIQT708jATAWl2lljY_lthohWpmWJt9GXTEm7vFvAsmGwEX9aNb1HtZxzJXtOMuzDslySM&loadFrom=DocumentDeeplink&ts=2434.68)):

Yeah. It goes back to us not being subjects but now protagonists, because if we're always replying, then it means that action is being put upon us by a separate protagonist and we just have to reply, but if, I guess, we decide where the narrative starts, if it starts with the HeLa cells going to Andromeda, if it starts wherever, then we can be the protagonist of whatever we want.

Sonya Dyer ([41:05](https://www.rev.com/transcript-editor/Edit?token=5_zfE-DG5TW865LNag7E9BL7tj0smIdwkJEmBPL-Le4kxEdcaAKbGs7zPe8xNEkJHGtWsNBvIDxDAo_KFO8zLgevEwg&loadFrom=DocumentDeeplink&ts=2465.52)):

Yeah. And saying actually, this is what darkness is, this is what darkness means. I don't know what you were talking about back then, but this is what it is. It's endless, and we keep producing it and reimagining it because we can, and we always have.

Weyland McKenzie-Witter ([41:23](https://www.rev.com/transcript-editor/Edit?token=esA3FzkO81RO-GLBtjyjFyoXosKPb6qbTALIgwQxyqlNgoqi3rCj2WS8VUOt2sU-9CQGU1R8ivIiwRm30XNzYnGyzTA&loadFrom=DocumentDeeplink&ts=2483.58)):

Yeah. It reminds me of, I think it's Huey P. Newton, that power is the ability to define phenomena. So if we're able to define what darkness is, if we're able to define the narrative of the HeLa cells, then that in itself is power, I guess, and that's dark fecundity.

Sonya Dyer ([41:46](https://www.rev.com/transcript-editor/Edit?token=Ji_tEZG2R4BdvDUB4ziAfUFONYahQL5BaxlzXW9G0fA1QuQPwVu2k28BY3UaD6cJ8w-KHv9krEYqFjF-gOVCumRDH9I&loadFrom=DocumentDeeplink&ts=2506.65)):

Yeah. And the ideas on it being a fecund, it means that it's fertile, it's ripe. It means it can live on, it can reproduce, it can multiply.

Weyland McKenzie-Witter ([42:00](https://www.rev.com/transcript-editor/Edit?token=n_ZwtiSE973Ok0YfanMc6MWSOFuC7caPYiX4Bdd14SANflx60s76rlHsg9IbtAXBO1hhFdIjpXllqW_-zjKbDtc__VQ&loadFrom=DocumentDeeplink&ts=2520.15)):

Well, this is a series about archive and from Andromeda to the name of the fleet, to Uhura, it's all about our memory of the past and how our memory of the past can affect our beliefs of what is possible for the future. And so I guess the concluding question, conundrum, I'm not sure what it is, is how can we use the process of archiving to actively construct the future that we want to see?

Sonya Dyer ([42:36](https://www.rev.com/transcript-editor/Edit?token=-3HyneoI62iCpRdXYrmcuEmQuTUB7c4j7sFoHX6sr9nVMud61HTlwY_C8s1uoVXv4o8OSbJeO9TFrKH-yUigfp2YdH8&loadFrom=DocumentDeeplink&ts=2556.3)):

That's a great question. I mean I guess it also starts with reimagining what an archive can be and reimagining what deserves a place in an archive, what deserves to be preserved, and this falls into the conversation around monuments which I'm also engaged with with the sculptures, in particular with the ships, but being open to the meaning of things changing with time. So the Colston statue is a prime example. When the statue was initially created, it wasn't hugely popular then, no-one wanted to pay for it then, but it became mythologised as this symbol of stability and of Britain not being ashamed of its past or whatever, that completely mythologised, which then led to it becoming the symbol of things that a new generation actually wanted to remove from sight, didn't want to celebrate, didn't want to lionise. It returned to the antipathy that actually was there right at the beginning of its creation.

Sonya Dyer ([44:09](https://www.rev.com/transcript-editor/Edit?token=pV0sxNYVPm73r_-bQEFzJIbz3qfCRbpooglg9w9wUFY79hvGnjs5PTcx3tkDjzMXyxGYh6ugs-5Z0PTmQpSJndquTco&loadFrom=DocumentDeeplink&ts=2649.06)):

The myth was in the idea that it was something that was welcome, not in the idea that it didn't need to be there to begin with. So I think that kind of flexibility, that temporal flexibility, is really important in thinking through what an archive can be. If you think of an archive as a form of preservation, that's what I think it can do. If we keep ourselves open to change and to being fluid, that Bruce Lee says be like water, just thinking of time as water, thinking of space as water, for me I'm interested in honouring stories and mythologies that get misremembered, that get forgotten or neglected, most often quite deliberately. Just excavating those and then seeing what role fictioning can have in reimagining the utility of those archives as well.

Sonya Dyer ([45:17](https://www.rev.com/transcript-editor/Edit?token=PNlt9LIaNz1qo7Wsyw6_jAPnv6YugJjMEuDZz83hqxog7vTM1KJPeauQXZA_-N-KnAdRIEvRaAXVA2lvhakzz-3X_e0&loadFrom=DocumentDeeplink&ts=2717.76)):

So thinking about Nichelle Nichols, not just as this beautiful woman that looked great, and used little dresses, and who played this iconic role, but actually as someone who very consciously, and deliberately, and purposefully weaponised her fame to, in a very material and real way, change things at NASA. I'm really fascinated by that kind of three dimensional, four dimensional life because to me, it's the kind of life that isn't always afforded to black women, particularly of her generation. So she's a particular fascinating example of that and it's no mere coincidence that she wrote her own account of her life, that's her archive of her life. So we do have to write our own histories and write ourselves into history. That's potentially the power of the archive because her writing her story influenced me and so many other people.

Laurent John ([46:42](https://www.rev.com/transcript-editor/Edit?token=Sfaxs0s5L-bHQkZMFF2ny4AEbRMbHW7ai6N2gvCp5H_dsMCJhyEALQTTUk592uR1RFzxQz0leuLMfCYv5UzrVjzhTVU&loadFrom=DocumentDeeplink&ts=2802.3)):

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