Unit 1: A Photographer's Life

Annie Griffiths: I got started in photography kind of by accident. I was in a journalism program and got a camera and decided I'd take a class just to learn how to use the camera.

And, um, two weeks later, I changed my major. My whole life, I thought I'd be a writer. And there was something about being in that class, going into a dark room, watching, you know, being in kind of that dark wonderful place watching images come up. I realized that's what I wanted to do.

Our kids have traveled to every continent except Antarctica. More importantly, when we travel, they've lived in communities. We never stayed in hotels. And, so, they were always in little communities where they were hanging out with kids, and sometimes they had a language in common and, many times, they did not. And they learned how to have fun the way those kids had fun. And they're very confident travelers.

Our daughter, you know, has—she's eighteen now—and she has no problem hopping on a plane, going overseas, and it is not a stressful thing for her. She really, um, is excited about it and remembers all of our trips with, you know, enthusiasm and great memories.

So, I think they also, our kids... I think our kids also understand that people all over the world are different—that you don't assume that they are going to be the same as we are. But then if you go into each culture open, and look people in the eye, and observe and listen, you're going to make connections that are well beyond what most travelers get to see. And I think what I've learned from my kids is how delightful flexibility is, and how naturally flexible most kids are. As long as they've got the basics—you know, food and sleep and a little something to keep them entertained—they pretty much can set up camp anywhere.

Almost everything's been photographed. And, so, the real challenge for a photographer is to bring her or his own unique vision to that subject matter. And in the case of the work that I do on assignment is primarily, um, telling a story that is compelling enough. Or, you know, the photograph is compelling enough to get people interested in reading the captions or what's going on. And hopefully that will lead them into a more in-depth written piece. It's a,

it's a wonderful, terrible job because you get this opportunity to go out and do it, but then you're supposed to do it better than it's ever been done before.

What traveling has taught me is that once, you know, you step into another culture and you allow yourself to really immerse yourself in another culture, um, and be available to them, communication happens very quickly. And it doesn't require perfect language skills, it doesn't require introductions, it really—it's really something that happens when you are your honest self, when you recognize that you're a guest in another culture and that you really need to listen to people on a different level and abide by their way of doing things. That's the best part of travel for me.

I think one of the most inspirational parts about photography is that you're never done. You're always growing and, when you travel, you're always learning. So, to have a career where I'm... I get to be creative, I'm immersed in really interesting situations, and I continue to grow artistically—what's better than that?

Unit 2: Jellyfish

Narrator: Jellyfish can be found all over the world, from deep oceans to shallow coastal areas. They've been around for hundreds of millions of years.

Boneless, brainless, and bloodless, jellyfish are some of the most diverse and fascinating creatures in the sea. Jellyfish aren't actually fish. With thousands of different species, in two different biological phyla, jellyfish is more of a broad term than anything else.

Unlike fish, which have backbones, jellyfish are invertebrates. Jellyfish got their common name from the jelly-like material they're made out of called mesoglea. In recent years, scientists have started using the umbrella term sea jellies to clear up the confusion.

There is an immortal jellyfish. Jellyfish can reproduce sexually by releasing sperm and eggs into the water, and reproduce asexually by splitting into two or cloning. But at least one jellyfish can actually reverse the aging process. The Turritopsis dohrnii has earned the nickname the immortal jellyfish for being able to undergo a process called transdifferentiation. An adult or juvenile under stress, instead of dying, can revert back to a polyp and begin the life cycle all over again. It is the only animal in the world that is known to be able to reverse its life cycle.

Box jellyfish are the most venomous marine animals in the world. Jellyfish stings are a common fear of beachgoers worldwide, and with good reason—there are an estimated 150 million jellyfish stings reported annually. And while not all jellyfish have stingers, the Australian box jellyfish, or Chironex fleckeri, is considered the most venomous marine animal in the world. Its deadly tentacles can grow up to 10 feet long. Humans and other animals that are unlucky enough to get stung may experience paralysis, cardiac arrest, and even death within just a few minutes.

Jellyfish are 95% water. To put this in perspective, the average adult human male is about 60% water. But jellyfish are much simpler than humans. They don't have hearts, blood, brains, or bones. Jellyfish do have very basic sensory organs in their bells and tentacles, and a simple digestive cavity which serves as a stomach, intestine, and esophagus. If a jellyfish washes up on the beach, it will mostly evaporate due to the high water content.

Groups of jellyfish are called blooms, swarms, or smacks. Jellyfish blooms can form quickly, and scientists think that the jellies get together for mating purposes. In extreme cases, the bloom can be so dense there are more jellyfish than water in a given area. They can be as small as a cubic meter, or cover hundreds of square miles. While these blooms are natural, they've caused problems all over the world, such as clogging fishing equipment in Mexico, destroying Chinese ships, and closing beaches in Australia and Europe.

There is still so much to learn about these floating, mysterious creatures. Scientists believe that there may be as many as 300,000 species of jellyfish that we haven't yet discovered.

Unit 3: Is Our Food Safe?

Narrator: How often does food make us sick? It's hard to tell since so many cases go unreported. And globalization of food production makes it harder and harder to track. But we do know this: At least one in six Americans gets sick from food poisoning every year.

And while most of them recover without any lasting effects, many end up hospitalized—and some even die.

These illnesses can originate at any point from farm to table. Contaminated water, animals, or equipment can taint food. Unhygienic conditions can allow pathogens to grow; improper temperatures can cause food to spoil; poor sanitation can allow bacteria to multiply; and even carelessness in our own kitchens is a risk.

Take an E. coli outbreak in Germany in 2011. Nearly 3,000 people became sick with diarrhea, fever, and vomiting. 855 developed a more severe illness. The German government raced to find the source of the outbreak and warned consumers to be cautious of lettuce, tomatoes, and cucumbers. But 16 days later, officials reported that sprouts were the real cause. In the end, 53 deaths and more than 3,800 cases were reported, affecting 15 countries.

Preventing outbreaks like these in the future may prove challenging. In the U.S., 80 percent of foodborne illnesses are caused by unknown pathogens. But, by monitoring the risks in our food chain, we all might dine with a little more confidence.

Unit 4: Robotic Hands

David Gruber: We're in the northern part of the Red Sea, and the reason we're here is we're trying to test out our squishy robot fingers for the... for the first time in a reef.

So we tested these squishy fingers in a swimming pool, and now we wanted to put them to the true test. We wanted to try them underwater in one of the richest coral environments that we have.

Robert Wood: Squishy fingers are making a robot hand but making it out of rubber. The idea came up when I met David, and he showed me these fantastic videos of him, you know, going underwater with his robots. But the hands that he was using were meant for oil exploration, and so they were basically just destroying everything that they touched.

So, I said, you know what: We can make squishy fingers.

David Gruber: It's a nice grip, you know. I think this is gonna work great.

This area here is one of the richest coral environments that we have.

These squishy fingers do work well on land, but do they work well under the water? We're gonna find out soon.

If we can grab that, that'll be interesting because it's... it looks very fragile.

Team Member: Oh, do it. Grab it. You're in there. Squishy robot fingers!

David Gruber: From this, we could do the entire genome. We could sequence out proteins. This is all we need.

It's super exciting! I mean, we're basically in the first steps, but you could just see just the amount of potential that they have.

Unit 5: Cave Artists

Narrator: Wooly mammoths, steppe bison, and other large mammals once roamed alongside people across Eurasia.

Tens of thousands of years later, we may have a glimpse into this Ice Age world through the cave art left behind by early humans.

Around 400 art-filled caves and shelters, predominantly located in France and Spain, have been discovered so far. Some of the most elaborate prehistoric artwork exists in caves in France known as Lascaux Grotto and Chauvet-Pont d'Arc.

Cave art dates as far back as 65,000 years ago to the time of the Neanderthals. Though, radiocarbon dating and other methods have revealed most art to be less than 40,000 years old and created by Homo sapiens.

The majority of cave art depicts animals that humans would have encountered or hunted during the Ice Age, such as mammoths, horses, lions, aurochs, and deer. Some human figures and other symbols have also been discovered.

Cave paintings were mostly created with red or black pigments made from rocks. Some artworks were painted directly onto cave walls, while some were first engraved into the stone with tools. Occasionally, the artists would follow the natural contours of the stone walls to accentuate an animal's features. Ever since the late 1800s, people have debated the meaning and purpose of cave art.

Some scholars think cave paintings were created by shamans, who would go deep into caves and enter a trance-like state, drawing animals they encountered in the spirit world.

Symbols repeated across artworks may indicate that those symbols had agreed-upon meanings among the artists. Thus, perhaps cave art also represents the earliest form of graphic communication.

In reality, cave art may have been created for a variety of reasons. While we may never know with absolute certainty why cave art was made or the meaning behind individual

paintings, these works give us insight into the evolving minds of our prehistoric ancestors and the world in which they lived.

By one view, cave artists were prehistoric naturalists. Their detailed drawings may teach us about the appearance and behavior of animals that have long been extinct.

But perhaps more significant—a part of our never-ending quest to find out who we are and where we came from—cave art may provide evidence of a time when humans were first able to etch their thoughts in stone.

Unit 6: Take the Money and Run?

Host: How many of you have heard of the phrase 'if it's too good to be true, it probably is'?

Wise words to live by, right? What if we set up an experiment where that wasn't the case? Would people's distrust keep them from taking advantage of a no-strings-attached, guaranteed-win situation? We're about to find out in this next game.

For this next experiment, we're setting up a booth in a public place. We're gonna offer free money to people walking by. They can take as much or as little as they want. We've hidden cameras everywhere: They're in the booth, in the buildings. They're even hidden in the bushes. What do you think people will do? Will they take the cash?

So, is this the dumbest experiment we've ever done? Of course people are gonna take the money—or will they?

Would you like some free money? Excuse me, do you want some money for free? Hey, you guys want to take this cash? We're giving it away. Free money.

So, what would you do? Would you take some money, or would your trust detectors go off?

Do you want some free money?

Woman: Is it really free?

Host: It's free money.

Woman: Are you serious?

Host: I mean, this is all about trust, so you have to trust me.

Woman: Are you serious?

Host: Yeah! This is about trust. I'm smiling.

Woman: Is someone going to attack me or like, what?

Host: I promise there's no strings attached.

Woman: Do you pinky promise?

Host: I pinky promise. There's no strings attached. It's just free money. Just free money.

Woman: You swear?

Host: It’s free!

Even when people took the money, they were sure it was a trick.

Take as much as you like.

Man: What’s the catch?

It’s free money. Enjoy.

We're giving away free money.

Man: Seriously?

Host: Yeah, it's free, man.

Man: What’s wrong with it?

Host: Nothing's wrong with it. No, this is about trust. It's not fake. It's about trust.

Man: Can I put in a dollar?

Host: Can you put in? If you like! But this is more for you to take.

We are giving people a chance to take money, and he's trying to put money in. What's wrong with these people? You would think it would be easier for people to take money, but people just hesitate.

Now we've refilled the box, and we're gonna make one big change: We're going to leave the booth unattended. I'm up in the control room watching the action being recorded by our hidden cameras. Without me guarding the cash, we expect people to take the money. I would. Wouldn't you?

Ah, here it is. Oh! Right away. Oh, oh, oh! She's like, yeah!

If I was walking to work and saw that box of money, I'd do the same thing.

Wow, that didn't last long. We loaded it up with cash one more time. As we expected, the money was gone in a flash.

What if we replace me with a giant pair of eyes? Will people still take the money?

Oh, there's a guy! Oh, oh! Come on, man. Live the dream, dude. Live the dream!

Look at these two guys. They're like, yep, drinks on me, man. No. People just aren't trusting. They just assume that there's a catch. Free money. A sign that says so. A box of the cash. Take it. People just don't.

Here's a guy. He's observing. He's like, what is this? Free money, huh? Whoa, I wonder if it's real. What's he looking for? A bigger box of cash?

This guy's skeptical. He's thinking about it and he's looking around. He's like, what is this? How could this be? He's so confused and the eyes are staring him down, causing even more—Oh, ho! And he nods and leaves!

This guy's afraid to even touch it. Don't worry. It doesn't bite.

You see the big pair of eyes staring people down. People feel watched. They're not taking the money. There's a reason for that.

There are huge sections of neural territory devoted to processing and creating eye movement. When people see these eyes, even though it's just on a poster, it reflects something deep and innate inside of them, and you can see that in these people's responses to those watchful eyes.

Unit 7: Social Conformity

Narrator: Take a look at this crowded waiting room. These people may appear to be waiting for the eye doctor, but they're actually waiting for the first test subject in our hidden camera experiment. And here she is, right on time for her 12 o'clock appointment.

Receptionist: Hi. How are you doing?

Narrator: This woman thinks she's here for a free eye exam.

Receptionist: Have you been here before?

Participant: No, it's my first time.

Narrator: What she doesn't know is that everyone else in this room is working for us.

Receptionist: They'll be with you in just a couple of minutes.

Narrator: Today, we're running an experiment on social conformity—and the test starts now.

Did you hear that? These people sure did. It doesn't take long for our test subject to notice a pattern. Beep means stand up—but why? And if you were in her shoes, what would you do the next time the tone sounds? While you might think you make your decisions all on your own, when it comes to peer pressure, all too often your brain is just following the crowd.

After just three beeps and without knowing why she's doing it, this woman is now conforming perfectly to the group. But what happens if we take the group away?

Assistant: Elaine, please.

Narrator: OK, now she's alone. The crowd is gone, and nobody is watching her except our hidden cameras. What do you think she'll do?

She's now conforming to the rules of the group without the group even being there. Now, watch what happens when we introduce another outsider who doesn't know the rules.

Receptionist: Have a seat and they'll be out in just a couple minutes.

Participant #2: Great.

Receptionist: Thanks so much.

Participant #2: Why are you standing up?

Participant: Everybody was doing it, so I thought I was supposed to.

Narrator: We keep the cameras rolling as more unsuspecting patients arrive. And slowly but surely, what began as a random rule for this woman has now become the social norm for everyone in this waiting room.

This tendency for individuals to copy the actions of a larger group is what we call herd behavior. It's how we become socialized. And it's why even this rebel who wasn't standing for any of this nonsense eventually joined the ranks.

Unit 8: Beating a Lie Detector

Examiner: Hello, Jonny.

Jonny Phillips: Hi there.

Examiner: Would you like to take a seat?

Jonny Phillips: Sure.

The lie detector, or polygraph. How useful is it in detecting whether someone is lying? Is it possible to beat a lie detector? That's what Jonny Phillips wants to find out.

Lying is a stressful business. The natural physiological reactions to telling a big fat whopper is that your pulse quickens, you breathe faster, and you start to sweat. Polygraphs work by detecting these changes, so any spike on the chart can indicate stress and, therefore, the possibility of a lie. So, the key to deceiving a lie detector is to try and hide your real stress levels.

24 hours earlier, Jonny was in the lab with his friend Richard. When Richard wasn't looking, Jonny stole his games console. Can Jonny now hide his act of dishonesty from a polygraph?

I was hooked up to it so that my breathing, skin conductivity, and blood pressure could be measured.

Polygraph tests start with the examiner asking a series of basic questions to which the answers are known to be true. This establishes a baseline, which indicates the average stress levels of that individual.

Now, one rumored technique used by old spies was to put a drawing pin in their shoe. Now I'm gonna press my toes down onto this pin during the baseline questions. Hopefully the pain will increase my stress levels so that, during the potentially incriminating questions, my nervous stress won't register any higher on the charts.

Examiner: OK. I'm gonna ask you a series of questions. I just need you to answer 'yes' or 'no' to each question. Are you known as Jonny?

Jonny Phillips: Yes.

Examiner: Is today Tuesday?

Jonny Phillips: Yes.

Examiner: Keep perfectly still for me.

Jonny Phillips: Which is quite difficult when your big toe's jammed down on a drawing pin.

Examiner: Are you wearing a gray jacket?

Jonny Phillips: Yes.

With the baseline questions over, it was time for the main interrogation to begin. I was also hoping another trick might fool the machine. Stress makes you sweat more, which increases your skin conductivity, putting telltale spikes on the graph.

So, earlier, I'd sprayed my fingers with anti-perspirant to reduce the flow.

Examiner: The test has started. Regarding the missing games console, do you intend to answer truthfully each question about that?

Jonny Phillips: Yes.

Examiner: Prior to age 25, did you ever steal anything from a shop?

Jonny Phillips: Yes.

Famously, in the late 80s, CIA agent Aldrich Ames beat two polygraph tests while he was spying for the Russians by, apparently, just being super relaxed. Have my techniques worked with similar results?

Examiner: Prior to 2005, have you ever taken anything from a friend knowing you would not return it?

Jonny Phillips: No.

Examiner: Do you know where the missing games console is right now?

Jonny Phillips: No.

Examiner: Did you take the missing games console that Richard was using?

Jonny Phillips: No.

Examiner: Well, Jonny, we've come to the end of your test, and I'm afraid to tell you that you actually failed the test. There was one particular question, which was 'Did you take the missing games console from the bench in the lab?' And it shows a significant change in your breathing, in your galvanic sweat resistance, and your blood pressure. You failed one question, so you failed the entire test.

Jonny Phillips: I'd made a fatal error. Apparently, the pain-induced stress caused by the drawing pin produced a totally different spike to that caused by nervous stress. And tests have shown that most anti-perspirants actually increase skin conductivity.

I may not have beaten the lie detector, but a failed test isn't enough for a conviction in a U.K. court of law—although it might help persuade a jury.

Unit 9: Archeology from Space

Luis Jaime Castillo: We are the detectives of the past. And we have to figure out what happened.

Peru is super special archeologically because this is one of the cradles of civilization. It is where civilization actually arose from nothing.

Sarah Parcak: A little over a hundred years ago, Hiram Bingham went to Peru and, relying on local knowledge, found this crumbling city in the middle of the rain forest. At the time, he used state-of-the-art photography equipment to record what was there.

It was the first scientific archeological expedition that National Geographic funded. And, in some ways, it helped to launch our modern age of archeology.

So, the idea of applying new state-of-the-art technology to map sites in Peru feels like a natural extension of what Hiram Bingham did over a hundred years ago.

Luis Jaime Castillo: One of the dreams of archeology has always been to look from above. As drones became available five or six years ago, archeologists jumped at this opportunity. Finally, we can fly above our excavations and take a picture that reveals everything that we have seen from below.

Now, if you simply go up, up, up into the space and look down with a camera, you can at the same time look at not one square mile, but many square miles. And then you can focus on specific items that you think are important.

Sarah Parcak: Space archeology is the study and the use of satellite images for mapping ancient archeological features and environmental features, by looking at different parts of the light spectrum.

We see subtle changes on the Earth's surface caused by what's buried beneath. And what satellites help us to do is pinpoint areas, and we know to within a few meters exactly where something is from thousands of miles away.

We're the generation with all the tools and all the technologies to be able to map sites and protect them. And using these new technologies, we have a real chance to protect and preserve these sites for future generations.

Unit 10: You Are What You Eat

Narrator: In 2014, photographer Matthieu Paley traveled to Crete, Greece's largest island, to learn about the diet and lifestyle of the Cretan people. Here, he talks about his experience and shows photos from his trip.

Matthieu Paley: So, I went to Crete, and I did not go to one specific area. I went all around Crete. But I ended up spending quite a lot of time in central Crete where the word Kriti is written. There's about 600,000 people living in Crete.

This is breakfast, the first day. And people adapt to anything. All these areas I visited, traditionally... if they eat only traditional food, they are all fit as hell.

I was lucky. I was there exactly a year ago. And it was time of Horta. Horta means herbs, mean the wild herbs. And so I see this old woman on the second or third day walking around, you know. And I follow her, and she's got this super sharp knife and, whoa, easy, what is she doing? She just laid down under the olive tree and she started to gather all this various wild chicory, wild fennels. All is just, goodness, it's just... it was a really beautiful scene.

And so I followed her, you know. She didn't have enough space... into her apron, so she started to take off her stuff and rolled all the wild herbs in it. It was a very beautiful moment. Vangelio her name is, 80-something-year-old woman. And then she goes back, and her daughters are there, and they start to go through all the hortas. You know, clean them, separate the different kinds.

Any average Cretan woman would give you about 20-25 names of wild herbs and go in the field and find them, and be able to know that this is still part of their knowledge. I was really blown away by this. Then they mix it with eggs. They make this Dolma with stuffed grape leaves. And then they pulled out this dish, geranium leaves fried in olive oil. Even the French fries are always fried in olive oil. There is no other oil than olive.

This is tuna plant, I was told. It's beetroot. It tastes like earth, beautiful, with oranges—they mix that. Driving around Crete, we passed vineyards. Wine comes around four, five

thousand years ago from that part of the world. It has olive groves. Olive oil is like, you know, the quintessential stuff you think of when you think of Mediterranean diet.

Narrator: As Paley continued driving around, he met people who were self-sufficient and living off their vegetable gardens. He stopped in a coffee shop where locals were having their breakfast. He ended up in central Crete, in a village called Meronas, where he was invited to dine with a local family.

Matthieu Paley: You know, this is Saturday afternoon at the Moschonas, in this little village. And they just eat, man. There is wine everywhere and drinking. They're coming back from the field, people are going. There is so much noise. Could be in Italy! You know, in my mind I was like, 'Wow, my God, the noise level in here!'

And so they are having chicken from the farm. They are having lots of snails, all the time, all year round. They have wild asparagus. They have fava beans, sardines. You know, wine, wine, wine! And they eat a lot of snail there, all the time.

It's full of omega-3. There's no fat in it. It's super good for you.

Narrator: So, the Mediterranean diet isn't just healthy; it also emphasizes the joyous social nature of food. It's not surprising then that, overall, Crete residents enjoy a good quality of life.

Unit 11: Your Water Footprint

Cotton is everywhere: in your furniture, in your food, in your wallet, in your closet.

Cotton has a major impact on the planet. Take your favorite cotton T-shirt. It takes 2,700 liters of water to make one T-shirt, enough for one person to drink for 900 days. It also takes a lot of energy to grow, manufacture, transport. Mostly, it needs energy to care for it.

One load of drying uses 5 times more energy than washing. One load of washing uses 40 gallons of water. Now think how often you wash & dry your T-shirt.

Don't we have plenty of resources?

Plenty of water? Yes, but 97 percent is salty. Nearly 2 percent is locked in snow or ice. That leaves less than 1 percent that we can access and 70 percent of that grows our crops.

Cotton is a very thirsty crop. Now, think how many T-shirts are in your closet. Now, think how many T-shirts are in your city. Now, think how many T-shirts are in your country. Now, think how many T-shirts are on the planet.

How many T-shirts do you need? How often do you need to wash and dry them?

There is a solution. We can use less water & less energy. Skip the drying and ironing and save one-third of your T-shirt's carbon footprint.

Choices make a difference. Make each choice count.

Unit 12: Shooting Stars

Narrator: They light up the sky and fall toward Earth at speeds 32 times faster than a speeding bullet. Meteor showers have been mesmerizing us for centuries, and they're a beautiful reminder that we are part of a busy and mystical solar system.

But what exactly are meteor showers? Where do they come from, and are they dangerous to humans?

Our solar system contains countless space rocks, or asteroids. Some can be as large as hundreds of kilometers wide.

Space debris smaller than an asteroid are called meteoroids. If a meteoroid falls into Earth's atmosphere, it will heat up and start to glow. The streak of intense light we see is the hot air left behind the burning rock. This is called a meteor, or a shooting star.

When Earth encounters many meteoroids at once, we call it a meteor shower.

There are around 21 meteor showers every year, with most of them occurring between August and December. Meteors enter Earth's atmosphere at speeds ranging from 25,000 miles per hour to 160,000 miles per hour.

It's frightening to imagine all that interplanetary debris flying toward us.

Cameras around the world have captured meteors falling from the sky, and although some eventually hit, most of them disintegrate or burn off. The remaining pieces fall into the ocean. When they survive the fall and hit land, we call them meteorites.

Scientists estimate that most meteorites are the size of a pebble. In fact, 99 percent of the approximately 50 tons of space debris that falls on the Earth's surface every day is of that size.

Some meteorites, however, are as large as boulders. The largest meteorite found on Earth is the Hoba meteorite, discovered in Namibia in 1920. It weighs roughly 119,000 pounds.

It's meteors of that magnitude—and potential bigger ones—that inspire scientists to dedicate their careers to understand how they form and how they travel through our solar system, in order to better comprehend them and look for ways to reduce their damage.