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At the airport a man with a "Hi, my name is" sticker approached me, told me he was the man named Sixto, and asked me if I was the woman named Amy. I was, and I got in his car, which had three wheels on the sidewalk and one wheel in the no-parking zone.

Death probably thought I was too cheap a shot, huddled against the "oh, shit" bar of a government van. I think that is the only reason I survived the hour and a half ride from the Luis Munoz Marin International Airport in San Juan to my new home. Sixto seemed to think that double solid yellow lines meant "please cross me."

Sixto caught the volume knob between the hairy knuckles of his second and third fingers. He turned down the talk radio and looked at me for ten seconds before speaking. "English is so confusing. For example," he said, picking up a printout of my flight confirmation, "How do you call this?"

"My flight confirmation."

"No, no. In general."

"A piece of paper."

"No, not that. Another word."

"A sheet of paper?"

"Yes. A sheet." He smiled and seemed not to notice when the car's wheels awakened cyclones from the side of the road. "So how do you know the difference between this and what you do in the bathroom?"

I paused, watching the primary-colored houses reflect against the peeling window tint and trying to think of an appropriate response. "I guess you just get used to it."

"English is so confusing."

When we arrived at Arecibo Observatory, I decided that the largest, most expensive telescope in the world looked more like the largest, most expensive skate park in the world. There was the 305-meter dish, listening to the universe's twenty-four hour broadcast, and all I could think was that I wished I had the coordination for extreme sports. I thought that maybe Dr. McLaughlin should have sent someone who could have come up with a better description.

I was a graduate student, and my advisor, Dr. McLaughlin, had applied for time on the telescope. He was the kind of tenured professor who had enough job security to say whatever he wanted about black holes, wormholes, time travel, and other astrophysical subjects of interest to the masses, so he was on sabbatical writing a sci-fi novel. Because he wanted the data from this project but didn't feel

like taking time away from his literary pursuits, he used his NSF grant money to send me to Puerto Rico. I found it impossible to refuse two free weeks on a tropical island, especially since I needed glowing letters of recommendation from my benefactor.

Sixto removed my luggage, which held clothing I considered adventurous and books I considered grounding, and pointed at a woman sitting on the porch of Unit 4. Anya Dauren and I would be living and working together on the pulsar collaboration, he said. Anya was wearing a purple plastic bracelet with the word "care" stamped into the band, synthetic pants that zipped off into shorts, a t-shirt from the gift shop of El Yunque National Rain Forest, and a pair of rubber gardening clogs.

Sixto said goodbye with a pat on the back that felt more like a spinal aneurysm. His brake lights created a cone of red haze around us as the van slid down the mountain and the molecules of humidity trapped the light. Anya handed me a frozen drink.

"Con," she said.

"Cone what?"

"Just con. In Spanish, it means 'with.' In Puerto Rican, it means 'with alcohol.'"

We sat on the porch of Unit 4, which was a 2BD/1B box made of weather-treated plywood held together by creative combinations of two-by-fours. We listened to the coqui frogs, who are named onomatopoeically after the noise they make from 8 p.m.-7 a.m. We talked about magnetars and millisecond timing techniques and our limited Spanish vocabularies. We sipped our pina colodas con. She settled herself into the porch's red lawn chair, and in the light that came through the haze of moth wings, I thought she had caught fire.

* * *

Pulsars are formed when a massive star can no longer support fusion. The star collapses under its own gravity. The area around it is assaulted with enough radiation to outshine the other 100 billion stars in the galaxy. The star lights up places that have been dark since darkness existed. It goes supernova and never goes back.

Left in the middle of this expanding light is a ball the size of Manhattan with the mass of two suns, a sphere that spins 86,400 times as fast as the Earth and is made only of neutrons. Every time it rotates, we see one pulse of light. Thus, pulsars.

Pulsars are the most stable objects in the universe—the only thing that can change a pulsar's rotation rate is a starquake, which is a very exotic kind of earthquake that happens very far away. After the subatomics have settled, the pulsar is never the same.

Anya and I were at Arecibo to observe two pulsars that orbited each other. They had recently been discovered and creatively named (J0737-3039A and J0737-3039B). Together, they formed the first known system of this kind, although surely there are millions of these binary systems at which we have simply failed to point our telescopes. I thought the most fascinating part about J0737-3039 was that A was much more massive than B. Its gravitational pull was stronger, its magnetic field larger. The power dynamic of this system was tilted in A's favor.

A and B were spinning so fast so close together that astronomers were already writing papers predicting their collision and subsequent merger.

* * *

The control room looked like a rocket's cockpit. Machines seven feet tall buzzed and blinked their communications. Wires seemed to come out of nowhere and then snake away into their hard drive holes. A huge plate glass window looked out on the white telescope. Positioned on this cliff, it looked like someone had spilled millions of gallons of paint into a valley. A beautiful mistake. In reality, the dish is made of 38,778 aluminum panels that fit together exactly. With a few keystrokes, I could control what all of that metal was looking at.

Anya and I sat in the control room on our first day, going over the plan we had made for the pulsars, when Richard came in. After observing Richard for the next two weeks, I realized that he had seven pairs of size twelve tennis shoes, but only one pair of shoe laces. I knew because the plastic ends of these purple laces were chewed off in exactly the same way every day. I was surprised he didn't have the days of the week written in permanent marker on his footwear. I guess he just kept track in his head.

Richard was our telescope "friend," the name given to people who work at the observatory full-time and help visiting astronomers navigate the \$100,000,000 of equipment. I can't see why they didn't trust us on our own.

"Where is he?" Richard asked.

"Who?" I asked.

"The observer in charge," he replied. He cleared his throat, making a noise an octave higher than I thought could come out of someone with such large feet.

"Anya," I said, pointing to Anya, "and I are doing the observations."

"Hm. Well. There were no first names on the schedule." He cleared his throat again.

Richard had jumped to a conclusion, and he was not happy to be wrong. Anya and I sat down to begin looking at the pulsars. Everything was going well until I dropped my pencil, and he muttered, "Can't do anything right," and pushed my chair away from the controls. He started typing, moving the telescope. "Just leave this to me. You two can go on and do...whatever you do."

I always remember the next moment in the way you remember an over-dramatized movie in which there are only three character roles: the villain, the victim, and the hero. I watched Anya tap Richard on the shoulder. When he turned, she curled her pointer finger in the come-hither gesture and whispered conspiratorially, "This is what we do."

Richard left and told the director that we no longer needed a "friend."

* * *

The karst mountains in northwest Puerto Rico were formed during the Oligocene epoch. Between twenty-three and thirty-four million years ago, the top carbonate rock was dissolved by the Caribbean Sea, leaving a section of island that looks like a crowd of giants wearing ghost sheets and growing tropical trees on their heads. Undereath these mountains is a cave network large enough to be used for nationalistic bragging rights, drug trafficking, human trafficking, and the kind of tours on which the guide points to the rocks (which are illuminated by Crayola-colored spotlights) and says, "Those are stalactites, not stalagmites. You can remember because ceiling starts with a 'c'."

Traveling from Arecibo Observatory to anywhere else on the island requires driving from the top of the karst to the bottom, and it always felt like a trip from the sky to the sea. The roads, on which no one found it necessary to paint lane lines, had an abundance of hairpin turns and a deficit of guardrails. There were no flat, comforting stretches, and there were no certainties. Were stray dogs congregating in the road around that curve? Would the car tailgating me down this 50% grade push his front bumper against my back bumper and propel us down the hill at unsafe speeds? These questions could never be answered until you either hit an animal or another car hit you.

Three days after I arrived, Anya grabbed the keys to a car, pushed them into my hand, and told me that all I needed to remember when driving through the mountains was that death isn't really that bad. She had spent a summer here two years before, and I assumed that gave her authority on this subject.

"If you want me to give you directions," she said as she belted herself into the passenger seat of the observatory's 1993 Chevy Cavalier, "you need to stop hyperventilating. You won't be able to hear me over all that breathing." I turned on the radio at volume 32—the highest it would go before the bass crackled and the left speaker only worked on every third beat.

We listened to WLYT, Your Station for Everything You Want to Hear, which was the most popular of five stations devoted solely to remixes of late 80s/early 90s adult contemporary billboard hits. Unbreak My Heart, The Wind Beneath My Wings, Please Forgive Me, etc. This music was the only kind I was allowed to listen to from ages 0-12, when my mother always played the "Lite Rock, Less Talk" station in the car. The musical experiences from my formative years proved (definitely for the first time) to be useful.

The song I knew best came on as we entered the one-bar town of Esperanza. When I was about to say that I could deliver the most rocking rendition of Lady in Red, she turned the volume up to 33 and showed me that mine was only second best.

"Do you want to be authentic, Amy?" she asked me after Chris DeBurgh was done crooning.

"Authentic like how?"

"See that unlit, unmarked highway about three hundred meters up? Turn there."

I drove for a few minutes on the road least traveled before she yelled, "There he is!" and grabbed my wrist so hard that the steering wheel pulled us next to a van that said Luigi's on one side and Luigi's on

the other. "Authentic like this."

Lugi Luigi's Pizza Parlor was a vehicle that had been in the same place for so long that I could see the passing of the seasons in his paint. The owner's name was actually Madesio, and he had never actually sold a pizza in his life. He bought the van from a bankrupt roadside pizza chain, but he thought that people who stopped to buy pizza would be pleasantly surprised. His culinary specialty was the pincho—cubes of chicken or pork smothered in red sauce and placed on a stick, a piece of garlic bread impaled on the top. A totem pole of calories. A monolith of taste. I still do not know what the sauce is made of. It is the kind of unidentifiable combination of familiar ingredients that makes you say, "This tastes familiar, but." The same way strangers can look familiar simply because their facial features are some combination of your third cousin and your best friend from third grade.

Madesio's head was too large for his shoulders. It made him look like the food he sold.

"For here or to go?" he asked.

"Would you like to eat with us?" Anya replied.

Madesio pulled a folding card table from the space between the grill and the van's center console and said, "Business is slow."

We each stood on one side of the table, placing the plate of pinchos at the empty end. Anya made a rule that each time anyone picked up a stick, they had to confess something strange they said, did, thought, or thought about saying, doing, or thinking. Something that would usually come out in late-night conversation when a friendship was a year or two old.

1. Anya read the CNN.com headlines every day, but rather than clicking on the serious news stories, she clicked on ones like "Shaken, not stirred—cocktail robots mix drinks" and "Emu on the run crashes kindergarten graduation".
2. Madesio was scared of accidents. All kinds. Because you couldn't see them coming but you knew that eventually, statistically, they would.
3. Every time I got the hiccups, I thought that the situation would turn into the world-record kind. There was a man who had the hiccups for 68 years. If I have the hiccups now, why should they ever go away? Why should anything change?

We ate and shared until the plate was a blank full moon, and Madesio said he had to go home and make dinner for his wife. We could stay as long as we wanted.

"Leave the table out. Someone might need a place to sit," he said and turned off the incandescent advertisement on the roof of his establishment. He walked to the house across the street, and we watched his shadow pull someone else's close.

We left a note on the table. It said only, "We'll be back."

I still have a hard time sitting in restaurants with cushioned privacy benches and piped-in easy-listening music, because the whole time I think about how much I want to eat meat off a stick, hold a can of Medalla Light in a sweaty death grip, and look at faces visible only because they are reflecting the moonlight. I may not have found myself that summer, but I found a few other people.

* * *

The Tanama River is a forty-minute hike from Arecibo Observatory. When Anya asked me to swim up the river with her, I said no, because flash floods routinely caused it to double in volume in 10 minutes. That seemed unnatural to me. Anya didn't ask me again, but she did bring me a bagged sandwich and some water and say, "Follow me."

During the trek down to the Tanama, we assumed we only had to be careful to avoid wet rocks, wet dirt, and wet lizards. What we failed to consider were the chickens. While clinging to a tree in a particularly steep (and wet) part of the jungle, I heard the call of a rooster. I automatically assumed it was some eight-foot-tall doppelganger alien that used the cockadoodledoo to lure in its prey, which it would skewer and roast and feed to its doppelganger family.

"Holy shit, what was that?" My voice came out all uneven.

"That was a chicken." Anya's did not.

"Who let a chicken into the jungle. Chickens can't go in the jungle!"

"You're here," she said, then smiled with her head tilted down and her eyes looking up, the way people do when they want you to forgive them for something stupid. "The farmers around here don't keep their livestock in cages. It's a very adventurous kind of free-range."

I looked around and saw the domesticated bird sprinting through the underbrush. The three claws dug into the ground, and occasionally a leaf stuck to one for a few steps. The rooster saw us, panicked, and ran into a tree trunk.

When we finally got to the Tanama canyon, the whole scene was straight out of the Mesozoic Era. I usually don't associate rivers with amazing beauty (it's more like alligators and algae), but I felt like I should have brought a camera to film a dinosaur documentary.

The water was cold, a rarity this close to the Equator. Anya and I swam upstream a bit, and I tried not to think about the flash floods. The cliffs were probably 50 feet above us, and when I floated on my back with my ears underwater, the only sound was flowing and the only color was green. The canyon's rock formations made me wish I were a geologist, simply so I could do more than mutter, "Awesome," over and over again. Water gushed out of holes in the cave systems surrounding us, and stalactites screamed, "We are so much older than you!"

"Can I take you somewhere?" Anya asked.

She took me to a place where the river was mostly blocked, and it fed a wide pool of translucent green water. A thirty-foot waterfall flowed out of the pool, crashing at a 30° angle against some rocks before continuing on to more rocks at the bottom. We sat on a safe rock and looked over the edge.

"They died here," she said, focusing her eyes on some distant point past the treeline. "They thought the water looked calm."

Anya told me about two other grad students who were at Arecibo during the summer she spent there. The three of them hiked to the Tanama. The two others, a man and a woman, were not thinking about the undercurrent that pulled water from the river, across the falsely placid pool, and down the waterfall.

Anya was taking pictures of the mountains, and she turned around just as the woman tried to grab a rock and stop herself from being pulled downstream. Anya's shock caused her muscles to tighten, pressing down the button on her camera. She has a picture of a woman, arms reaching upward out of the water, her head about to hit a rock at a 30° angle, her face registering knowledge of this. The press reported that the man's body was found under a rock at the bottom of the waterfall, but that the woman's was never located.

"That's why I don't read the real news."

Anya's tears mixed with the river water. When she spoke, she said that she was sorry, and it looked like the words were a line of blue jazz notes coming out of her mouth. I said I was sorry too. I said there was nothing she could have done.

I felt her arms around my waist and the rock biting my vertebrae. My eyes were closed, and I didn't say anything—I only wanted one sense to feel this moment. If it were split between five, a part of it might be lost or the pieces might be separated. I knew her only as heat. I was sure one side of me would blister by morning. That was how close we were.

It couldn't last forever. "I think we should go get some pinchos," she said. "I need to get out of here."

That night we went back to Madesio's. I let Anya drive; she needed to fear death a little bit less. When we arrived, he said, "Ay, gringos!" and immediately brought out the card table.

"My wife bought me a new grill for our anniversary," he said. It was a nice grill. It had racks for the pincho sticks, a gas heating mechanism, and a control panel, while the old one was based on the combination of steel, charcoal, and a match.

"I love her," he said, "but I hate this." He kicked the grill and glanced across the street at his house.

"This? Has too much power."

"You can always turn the gas down," Anya said.

"Yes, but will the gas listen, is the question." Madesio gestured toward the panel of knobs and then turned the flame from red to blue. "I like being able to put out the fire myself."

Anya said, "But you can control it."

"No, no. We are not partners. We are in this relationship, me and this machine, but I am afraid always that it will find out it has much more power than me. Do not tell it, and do not tell my wife."

I understood Madesio then. Empathized. But he laughed and said he was just kidding, that it was just a bunch of metal and that it had no thoughts and not to worry. I did not feel like it was a joke. At least not a funny one.

* * *

For fourteen days Anya and I spent hours in front of four control room computer screens. For thirteen days we saw nothing interesting. Nothing worth writing either home or the *Astrophysical Journal* about.

It was the last day. Anya left the control room and came back with two paper cups. The kind with windowsill flowers printed on the sides. The ugliest kind. Caffeinated steam escaped from the tops.

"They were out of Styrofoam," she said, handing me the one with unidentifiable flora the color of combustion.

"This coffee is too dark for Styrofoam, anyway," I replied. "It looks much nicer next to the flowers."

We drank until the caffeine made us dizzy with the feeling of being awake. Anya brought the coffee in new cups every time because she said that the sooner the supply was gone, the sooner the world would be a better place. At least the world inside the control room. I believed her.

We were slewing the telescope to its final rest position when Anya looked at Screen 3 and drew in so much breath I thought her lung would puncture itself to relieve the pressure.

"Amy," she whispered. "It's different."

I looked at the computer and saw that J0737-3039B's profile had changed. Anya and I would later write a paper describing how the starquake was caused by J0737-3039A's magnetic field. The powerful north-south magnetic lines had twisted around the smaller pulsar in a way that made its surface crack, shift, settle. But at that moment we weren't thinking about publishing.

I couldn't find any appropriate words. I had always thought, without ever saying so, that starquakes never actually happened, that pulsars remained always the same. That the theorists who came up with the idea had botched a differential equation or, at least, forgotten to carry the one at some point.

The only thing that could have changed J0737-3039B was J0737-3039A. They had approached close enough to become gravitationally bound, and A transformed B. Was this power good? Was it bad? Or was A's potential for influence just frightening? I thought about Madesio's not-funny joke.

"Do you think J0737-3039A is scary?" I asked Anya.

"No," she said. "What do you mean?"

"Do you think it was J0737-3039A's right to disorient J0737-3039B's world?"

"Are we ascribing consciousness to balls of neutrons?"

"I guess it's more like a metaphor," I said, and turned away.

Anya pushed my ergonomic rolling chair into the window that overlooked the telescope. I thought I might fall through the glass, maybe just drift out and over the expanse of tiles. Get away. I wished that the binary pulsars had just collided and merged, like everyone thought they would. That would have been fairer. More balanced. If we were ascribing consciousness to balls of neutrons, that is.

"Let's go to Luigi's and discuss our discovery over some food and maybe some beverages con," Anya suggested.

"We've had more coffee than there is in water in the Caribbean," I said.

Coffee is a stimulant; and beer is a depressant. I think we deserve to even things out."

When we arrived at Madesio's van, it was mostly gone. Everything was the color of his secret sauce. The flames ripped upward and sent their ashes to Madesio's roof. As we passed by, a piece of bread shot out of the roof and fractured. It looked like a flock of birds on fire.

The man sat cross-legged ten feet from his burning livelihood. Watching, just watching. His wife stood farther back and waved her hands at the fire as if that would make it stop. "She looks like the woman in my picture," Anya said.

We did not stop.

I took Anya's right hand in my left and moved my thumb north to south along her lifeline. Up and down. Touching the places hardship had washed away, feeling the karst topography of her skin.

Seeing her sheeted ghosts.

Anya made a U-turn, and we went back up the sky without saying anything. Lady in Red was playing in my mind, and I could feel Anya's hand shaking. A handquake, which is a very exotic kind of earthquake that hits very close to home.

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Sarah Scholes began writing fiction while studying astrophysics at Agnes Scott College. This has led her to Cornell University's MFA program, where she continues to couple science with stories. She lives in a very small room with a moon-shaped lamp, a dog-shaped robot, an empty squirrel-shaped cookie jar, and a piece of the collapsed Green Bank Telescope. Her work is forthcoming in *Diagram*.