

Chapter One

The uncertainty principle plagues my life

I don't care what anybody says, I *know* my mother isn't dead. Dad still tries to console me. He tells me my belief is a form of denial. *You need to grieve, Bria*, he keeps saying. As if he would take his own advice.

As I reach for the pitcher of orange juice, I catch him staring at me. In the space between the cereal boxes he gives me that look. I swear it breaks my heart. *You need to grieve*. I feel like hitting him. And then the guilt wells up. Dylan just stares at us, like he's watching a sit-com, waiting for the punch line, or for the commercial to interrupt the program. His spoonful of corn flakes hangs in the air, dripping milk onto the table. I reach over to wipe up the mess with my napkin, never taking my eyes off Dad. Until, out of the corner of my eye, I see that pattern the milk made on the table. That's when it hits me, jarring my mind with the memory of Mrs. Randolph's hand slipping on the dry erase board last week while writing a line from a Shakespeare sonnet, leaving a mark that made my stomach twist from its familiarity. Where had I seen that before?

I've listened with my ear up against the bathroom door when my dad has been in there too long with the sink water running. I can only guess this is where he cries, not wanting to do it in front of me and Dylan. He stumbles around the house in shock, misplacing socks in the growing mounds of unwashed laundry and leaving his briefcase by the door when he heads out to work. Just how can he work, anyway? He tells me it helps him busy his mind, hunching over his drafting table and designing

those miniscule parts for the Mars Rover that have to be constructed using high-powered magnification. *We've been over this a hundred times, Bri. You just have to let her go . . .* Calm, resolute. An objective scientist to the bitter end.

Dad leaves for work and I listen to his car drive away, feeling a knot of anger lodge in my stomach. It's been four weeks, and the front page of the Greenfield Tribune still rehashes speculations about the laboratory accident—mostly because of the destruction of all that expensive equipment. Like they don't even care that sixteen people vanished without a trace. But millions of dollars of laser equipment, highly sensitive optics, and painstakingly grown laboratory crystals? The replacement costs are staggering, if not preclusive. I'm only beginning to understand the pressure my mom was subjected to at the hands of the oh-so-powerful Department of Energy and why those last few weeks she had baggy circles under her red eyes, working long hours into the night on the edge of a breakthrough discovery.

I took a week off school. I'm not sure what was worse—having neighbors and former colleagues of my mom drop off casseroles and angel food cakes, mumbling condolences and patting my hair, (a gesture I really hate, by the way). Or walking through the school hallway and seeing eyes lock on to me as if I had the plague. Even the stupidest high school kid had heard of the work my mother was doing at the National Laboratory—a facility that employed most of their parents. Ground-breaking work—developing new sources of energy to save the country, if not the world, or so the propaganda went. Her scientific breakthroughs in identifying a stellar subspace energy source tantalized even the most moronic zombie on campus. Like something out of those ancient 2-D Star Trek shows. I've heard enough “beam me up, Scotty” jokes to make me puke. Nevertheless, a goodly number of Greenfield High students feel some measure of pride in knowing their school produced Nobel Prize-winning scientist, Carol Harrison.

I'm guessing that, in my teachers' estimations, I wilt in my mother's shadow. Their expectations of me are nothing less than colossal. But I try to hold my own. I'm president of the Chem Club, have unlimited access to the lab at school, and I even get to bore my fellow students with those mind-boggling abstracts pertaining to experiments they have no clue about. Maybe those small town educators feel some strange need to groom me as the star pupil, so that as they send me off to Harvard or MIT or Yale, I would make Greenfield High proud once more. Someday the principal would post my photograph and bio alongside my mother's on the hall bulletin board outside the attendance office. Whoopee. And no doubt someone would put some corny line up on the sidewalk marquis the last week of school, like, "Go Bria! GHS girl rocks the world!"

But now? Do you really think I could care less about getting into some posh Ivy League school? That my future career plans matter in the least? All I know is I still have one more agonizing year of high school to finish and then I have to face the rest of my life. Without Mom.

I look at the clock as I sit at the kitchen table, listening to Dylan roll a ball against his bedroom wall. *Thump, thump*. It's 2:43 in the afternoon and I've done nothing more than mope around the house all day. The rhythm of his thumping is precise; I watch the second hand on the clock and Dylan matches its measured path around the numbers, beat for beat. One month exactly since the accident. And in three minutes, to the minute, according to the official report released by GNL's public relation's team. The brief, sterilized announcement rings in my head. *Carol Harrison, prominent scientist, along with her team of fifteen coworkers, died this afternoon in a tragic accident at Greenfield National Laboratory.*

Thump, thump. My eyes return to the clock. A sinking feeling grows in the pit of my stomach as I watch the minute hand slide silently to 2:46. In this moment, the room above me goes silent. I can picture Dylan staring at his bedside clock, holding my volleyball tightly in his hands. Oh, he knows.

I remember I had been figuring out the last calculus problem, eager to pack up my books and get to my locker before Ryan Mitchell arrived to hover over me with that sick grin. As I punched the numbers into my graphing calculator, something made me look up. The door opened, letting in a wave of sweltering June heat. A few papers flew up from Mr. Hanover's desk and lighted on the floor. I felt a sudden rush of premonition, seeing my father standing inside the door, searching the room for my face and clearly afraid to find it. In a millisecond I knew disaster had struck.

As my dad stood next to my teacher in silence and let his eyes wander the room, I stuffed my calculus book, pencil, and calculator into my backpack and slid back my chair. I winced at the scraping noise and cringed under stares of puzzlement in my classmates' eyes. Surely the sense of doom and catastrophe was so palpable they all felt it. I could sense those stares following me out the door and even down the staircase to the parking lot.

My first thought was *Dylan!* Had he wandered out of the house while Debby, that ditz, was manicuring her stick-on fake fingernails? That was Mom's greatest fear—that he'd take off in a daze down the street and end up dodging traffic all the way to the Pacific Coast Highway in Malibu. She has never forgotten the day he figured out the dead bolt at age three and crossed town, traversed the Interstate—yes, all eight lanes!—and ended up in Millville, two miles away by the time she woke from her nap, searched the yard, and called 911. Dad was out of town at the time, giving a lecture at Princeton, and after Dylan was deposited on our doorstep by an irate and scolding police officer, Mom turned to me, nine years old at the time, and made me swear I would never tell Dad. I never saw her that scared before or since.

And I never did tell Dad. That was our little secret. We just tightened security around Dyl, but as he got older, he showed less desire to explore his outer world. His inner world began to consume him, pulling him inward like a satellite losing its orbit, drawing him down to a lower atmosphere where no rescue was possible. Mom and Dad knew he had "issues." They had comforting labels for

him: different, unique, brilliant, savant. At first, doctors brushed aside their concerns over his late speech development. His physical coordination tested average: hand-eye, motor skills—a typical boy in that regard. Then, subsequent batteries of tests confirmed their fears. Doctors said autism, but my parents preferred to call it by the more nebulous name: pervasive developmental disorder. I won't take the time to describe the resulting repercussions of that label. Just let me say that our lives were never the same. But things eventually morphed into a routine and pattern my parents could live with. And part of that routine meant burying themselves in their work, leaving me holding Dylan's hand. But I wouldn't have it any other way.

As we reached the front of the school, I finally found my voice. "Dad, what happened? Is Dylan—" I spotted our Toyota, parked illegally in the red zone reserved for the school buses. Already half a dozen buses had driven up and sat idling their rumbling engines, waiting for the throng of students to tumble out of their classrooms at the final bell. They still hadn't figured a way to convert the larger buses and trucks from diesel to electric and I noticed the ugly smoke belch from the exhaust pipes. I could make out my brother sitting immobile in the backseat of our car and a sigh of relief exploded from my lungs. I didn't realize I had been holding my breath.

But if Dylan was all right, then—

I yanked on Dad's neatly pressed white shirtsleeve. When he turned to me, still walking fast-paced to the car, tears trickled from the corner of his eyes. My mind went completely haywire. I said something ludicrous like, "Dad, do you want me to drive?" I had my learner's permit, and seeing his distraught expression, the only thing I could think of is that he was in no mental condition to drive. That he'd get us killed before he'd finally get around to telling me what happened.

He fumbled with the remote and unlocked the doors. Not that Dylan had any interest in escaping the confines of the car. One look told me Dylan was deep. That's the term I use. Often he is right there, just hovering on the surface, able to converse with me in some fashion. Mostly I can tell

what he means to say by the expression in his eyes and by his gestures and body language. But, in that moment, he could have been a manikin placed on the seat. Someone having bent his legs so he could sit, and folded his arms across his lap so his hands rested peacefully, one over the other. His eyes were beyond vacant. I used to think he was staring out at something, and I'd turn and glance around, try to see what caught his attention. It was only after many months that I understood he wasn't looking *out*; he was looking *in*. Then I wondered—just what *did* he see in there?

We made it to the Laboratory without mishap, although I did grip the hand rest tightly a few times at some near-collision misses. Dad was a lousy driver, for the most part. So, I was more than relieved to arrive at the security gate in one piece.

Two things struck me right away. We weren't at the East Street entrance, but some strange gate where a bunch of portable buildings lined a long parking area. The two-story lab where my mom worked couldn't be seen from here. The air had an odd quality to it. Like a bomb had gone off and blasted the buildings into a concrete dust that clouded the air and rained ash and debris down around us. Little did I know . . .

I sensed my dad's panic rising and could hear it in his voice as he spoke with the guard and gave his credentials. I couldn't make out the hushed whispering, but I heard the anger roil in my dad's throat. The guard tried to tell my dad to leave, and pointed in another direction. The whispering grew to yelling, until my dad rolled up his window, put the car in reverse, then did something I never thought possible. "Hang on," he said through clenched teeth. I saw the guard start to walk back into the security booth and I braced myself against the dash. I glanced back at Dylan and his demeanor hadn't changed. At least his seat belt was snug around his waist.

Dad threw the gearshift into drive and before the guard had a chance to run back toward us, Dad smashed through the wooden rail barricading the entry to the high-security Greenfield National Laboratory and high-tailed it full speed across the parking lot, sailing over the speed bumps and

coming down each time with a hard clunk on the asphalt. He swung wide on the first curve and clipped the electric charge station. Any other day we'd have a dozen patrol cars fast on our tails with sirens screaming.

As we sped, the air grew thicker and darker. I don't know how my dad saw where he was going. In fact, to this day I believe he was just running on some kind of inner radar, dodging parked cars and careening around buildings, racing to Mom—or where he thought she would be. By the time we arrived at the police cordon, we were two blocks away from the laser lab. I craned my neck out the window I had lowered, ignoring the choking smoke and air so thick I had to pull my shirt over my mouth and suck through the fabric. The air smelled like hot asphalt when rain first hits it—like dirt and smoke and rubber tires.

Dozens of people scurried around our car. People in uniforms: city police, lab security, firefighters, HAZMAT teams. Sirens and shouting ricocheted, adding to the thick, impenetrable morass engulfing us. Rotating lights splattered the air in eerie shafts of blue and red. An acrid taste coated my mouth. Dad leapt from the car and ran into obscurity. I opened my door, hesitating, fingering the handle. I strained to see past the haze and gloom, struggled to use some inner eye to find clarity and explanation—in both my real and mental worlds. No one would talk to me; they hurried past me as if I were invisible. And then a light breeze kicked up and I squinted, grit pelting my eyes.

When my hair stopped whipping my face and the stinging lightened, I opened one eye and peeked out. My breath caught in my chest and a lump the size of a grapefruit lodged in the back of my throat. The laser lab—nine acres of buildings, equipment, and personnel—was gone. Not demolished into piles of concrete rubble and twisted steel girders, like you see on TV surveying the aftermath of an earthquake. Just gone. A gray dust spread across the ground for blocks on end, like a peculiar sandbox of wavering dunes made of fine dust that kicked up in whorls with the slightest disturbance. A Martian landscape, like the photos Dad had pinned on his office wall. Desolate, barren wasteland.

Only now I stop to wonder what father in his right mind would drag his children to such a scene. But my dad was never one to weigh decisions when an emergency struck. He just acted on auto-pilot.

The rest of the afternoon blurred. Dad coming back to the car, talking to one person after another, huddling in conversation. Dylan unmoving in the backseat, someone running to the car and smothering me in a hug, babbling, crying, stroking my hair (which I really hate). My eyes stinging and itching, my skin coated in gray dust—the dust making everyone around me look like zombies emerging out of the earth.

At some point the sky darkened and I knew it was night. My stomach rumbled, reminding me of the ordinary life I left behind—a place where meals were cooked and eaten, where Mom would ask me how my day went and what happened at school. A place where my mom would get up in the morning, dress for work, and hurry out the door after a quick peck on my cheek. That place seemed remote and foreign to me. It stung me to realize those ordinary activities would now be relegated to the realm of memory. I would now have to try hard to recall every image of my mother before I forgot the simple things—her face, the way she brushed her hair, the little chuckle she'd make at Dad's bad jokes. I doubled over as if punched in the gut. I felt time stop. All life came to a screeching halt—here, in this inhospitable Martian landscape. The life I had lived up to this moment had blown away along with the buildings, like ashes in the hot, lifeless wind.

I let the memory of that afternoon settle on my heart. Maybe, like the dust covering the ground where the Lab once stood, it would eventually blow away. But what would remain? I hold on to the one constant that becomes my anchor every waking moment—no bodies were ever found in that sea of dust. No bone particles, hair, DNA—not a trace. *People don't just vanish into thin air, Bria.* My dad again—for the hundredth time. Who says air is thin? Mom certainly wouldn't.

I hear Dylan's bedroom door open and my brother come plodding down to the kitchen. My school term ended last Thursday, but Dylan's went year-round. Now that I am home for the summer,

Debby, Dylan's part-time caretaker, drops him home at noon for me to watch so she can attend summer classes at the community college. He walks over to the window, barefoot and dressed in his shorts and orange-and-blue Broncos T-shirt. He stares at the driveway, I swear, just like a dog waiting for his master to come home. I hear him say *Dad*.

Sure enough, about two minutes later, Dad's car tires crunch gravel up the long driveway to our house. I had made a plate of Toll House cookies earlier. I don't particularly like to bake, and I usually burn things because I get busy doing something and forget—until that burnt smell permeates the house. But today I was careful to watch the oven. I go to the fridge and get out the milk as my dad comes in and deposits his briefcase and keys on the hutch by the door.

Dad had lectured me to stop worrying about him, so I paste on a smile and bring him a plate of cookies. He looks exhausted and miserable but tries to cover it with a surprised expression. I know he means well, attempting to present a strong front. I just wish, instead, he would break down and cry and get all the pain out.

“Hey,” he says, polishing off a warm cookie in three bites, “these are great.”

“You skipped lunch.” My comment is an observation, not a question.

Dad mumbles and picks his keys back off the hutch. “Too busy . . .”

I can tell by his face he doesn't want to hear a lecture. I guess I have been lecturing him a lot this last week. He's lost weight; his clothes are hanging on him. And his face is drawn and pale—even more than usual. I've nearly had to force-feed him potatoes and pasta and microwave dinners, now that I'm the cook in the house. Not that we ever had normal dinners, with both Mom and Dad arriving home at odd hours most nights. The motto around here has always been a bit of “every man for himself,” or every woman. I watch him go back out to the car and retrieve a big cardboard box from the passenger seat. As I hold the screen door open for him, I ask, “What's this?”

He reaches into the box brimming with books and papers and hands me a large three-ring black binder.

“I cleared out your mom’s desk.” My mom’s private office was in another building in a different sector of the Lab, hence untouched by the accident. I can only imagine how hard that was for Dad to do. I picture him there, tentatively letting his fingers light on her desk, her photos, her chair. Like he does sometimes in the house when he doesn’t know I’m watching. Maybe wondering if she had left something tactile there, some residue of her that would tell him she really wasn’t gone.

I take the binder and wrap one arm around my dad’s shoulder and give him a kiss on the cheek. He pats my head and strokes my hair, but I let it slide. I realize it comforts him to do this, even though his intention is to comfort me.

When I pull back, I flip through the notebook pages. My eyes widen in awe and I feel a flush of heat rise to my cheeks. *My mother’s lab book—with all her notes on her experiments.*

“Dad, isn’t this top secret? Why wasn’t this in the lab that day? How did you—”

He puts a hand to my lips. “She wrote in this every day. All her observations, her tests. The last thing she worked on . . .”

My dad’s voice chokes up. He busies himself with some papers by the door, then mumbles an excuse and disappears into his study. Dylan comes to me and his eyes lock on the notebook. I thumb through the pages, eerily unsettled by my mother’s handwriting, the ink nearly fresh as if she had just written in them. Sketches and diagrams filled the pages alongside calculations and scribbles of mathematical formulas. I begin to turn another page when Dylan startles me by placing his hand on mine to stop me.

“What?” my eyes question him. His eyes answer back.

He drops his gaze down to the bottom corner of the right-hand page. My heart skips a beat. There is the same strange shape I had seen in the milk, and on the dry erase board. Dylan tugs on my

shirtsleeve and I follow him out the front door. When I went out to get the mail at lunchtime, I hadn't noticed it, but now it glares at me like a neon sign.

Pine needles lie strewn all over the driveway, but right in front of the concrete steps leading to the front door, the wind has blown them together, grouping them in a thick wad. There is no mistaking this for some random pattern. I know science and can tell when something defies randomness. I look at Dylan's face. A smile inches up—the first I've seen in weeks. He points to the notebook and I open it again to that page—where my mom had drawn a symbol alongside a notation on an experiment. It looks like a mountain, an upside-down V, but with the legs curving slightly outward. I flip through more pages and see that symbol over and over. And then I notice it drawn beside another sign and I recognize the Greek.

Lambda. The symbol for dark matter.

The other is Omega. Next to those two symbols my mother had written, $\Omega_{\Lambda} = \textit{cosmological constant}$. *A volume of space has the same intrinsic fundamental energy as matter . . .* I stop as a shiver runs down my spine.

My mom had talked to me often about her experiments, about energy just out of reach in subspace or some other dimension and how to tap into it. About the different particles created in atomic collisions—anti-matter, dark matter, and other things with mysterious names. I remember her telling me not long ago, with a flush of excitement, that she had found a curious link between dark energy and what Einstein referred to as the cosmological constant—or vacuum energy. Einstein couldn't accept the possibility that the universe could collapse in on itself, so he proposed a density and pressure associated with “empty” space, to counteract the gravitational force of matter and energy. That's why it's called “vacuum pressure.” All that empty space really not empty, but made of dark energy and matter exerting influence on us.

My mom had found a way to tap into that energy making up 74 percent of our universe—energy that could possibly be harnessed in ways that would stagger the imagination and save the world from ruin. Think about it. Those laser beams in the Lab—the ones now disintegrated in a pile of dust—created temperatures of more than a million degrees! The pressure of those colliding atoms equaled more than a million times the Earth’s atmosphere, similar to that found in stars and the cores of giant planets. Now you know why the DOE amped up funding for the Laser Facility. Princess Leia’s words rattle through my head: *you are our only hope, Obi-Wan Kenobi*. Only, now it’s Director Allen kneeling at my mother’s feet, the hem of her white lab coat tickling his bald head. *Save us, Doctor Harrison . . .*

A wave of hope washes over me. Now I will be able to uncover the cause of her accident. These pages will tell me what she was working on, the things she had discovered, the methods and premises of her experiments. I look across the page and see Λ CDM. I squint to make out her scribbles, worse than any doctor’s prescription. *Cold Dark Matter*. The words send another shiver across my neck.

Dylan squats on the driveway and points at the array of pine needles formed into a perfect lambda. His smile lights up his face—and my heart. “Mom,” he says, his green eyes twinkling under a wisp of wheat-colored hair.

In this moment I know without a doubt our mother is alive.

Chapter Two

“Demise ad nihil”: something cannot become nothing—so where’d it go?

Maybe most people would find it odd that our house has a full-fledged scientific laboratory in the basement, but I assure you—it doesn’t look anything like Frankenstein’s shop of horrors. No bubbling flasks of slimy green liquid simmering over Bunsen burners and emitting noxious odors, or test tubes full of unnamable body parts floating in formaldehyde. As I walk down the stairs and survey the room, I’m struck at how this small, dark space looks little more than an office, with fake wood paneling and my mom’s big rolltop desk against the wall. When you work with small lasers, all the corresponding parts—the focusing lenses, defractors, mirrors, beam splitters, photodiodes—are pretty small and far from impressive. Apart from the laser, and the sophisticated doped crystals (more about that later), mom’s lab is pretty low-tech. There’s a long flat table in the middle of the room for mounting all the parts. A swivel chair, a computer, a Holo-Vid player and large plastex screen, a filing cabinet. That’s about all.

When I was little, instead of buying me a V-R Holo-Erector Set like the other kids had, Mom would set down her giant box filled with those shiny metal and plastic parts, hand me a real Leatherman tool or a socket set, and let me at it. Just old-fashioned hands-on play. I constructed some pretty amazing castles and dragons, embellished with colored construction paper cutouts. With a stretch of imagination, you could tell the princess was trapped in the high tower while the knight

fought off the dragon at the edge of the mote. Well, at least I could. But Mom and Dad listened in rapt attention to my very detailed tours of the elaborate kingdoms I built on that flat, metal table.

As I grew up and broke fewer things, Mom had me assist her with simulations and trials. I felt like a nurse in the operating room. *Bria, a twelve-inch long tube, three magnets, one polarizer—that one, the bigger one.* She'd be hunched over the table, fastening pieces, taking measurements while I slapped objects in her hand. There was a kind of magical hush that came over the room when she directed me to turn off the lights and the laser would shoot a beam—red, green, yellow, depending on which laser—and the light would bounce against mirrors, spread, change color, and do strange things as it interacted with the crystal.

My eighth-grade project won me a first at the state science fair—generating optical second harmonics using non-linear crystals. The title was so long, it almost didn't fit on the backboard. I melted a few crystals, as well as their plastic holders, in the process, but I did succeed. I even manufactured my own KDP crystals in a saturated saline solution—though the biggest one I could grow in that little ten-gallon aquarium was the size of my pinky fingernail. The crystals they grew at GNL weighed in at eight hundred pounds in two months.

So, this room holds a lifetime of memories for me—windy nights with snow piling outside in drifts as Dylan and I drank hot chocolate and Mom wrote at her desk. Hot summer days when the air conditioner went on the fritz and we'd sit on the cool cement floor in our swimsuits and play Simu-Jacks while Mom ran through her trials. I have memories of Dad flitting in and out, seeing how we're doing, bringing us snacks, calling Dylan out to throw the Scooze Ball around. Most families had a den or family room; we had Mom's lab.

So, today, as I take out the polymer containers of sample crystals from the cardboard box Dad retrieved from my mom's office and lay them out on the side bench in a neat row, I'm struck with this unnerving feeling that my Mom will walk in at any moment. This is the first time I've been down here

since the accident and there's a laser experiment set up. I look at the oscilloscope setting, take note of the photodetector, the polarizer, the ferrite magnets set up to produce a transverse magnetic field. I don't recognize the laser; it's not one from our arsenal. As I finish unpacking all the crystals, I hear a yell from upstairs.

"Hey, Bria, you here?"

Ryan Mitchell. Great. By the time I turn around and head for the door, Ryan bounds down the stairs. "I knew you'd be down here," he says with a casual flip of his head. His short-cropped reddish hair splays out in all directions. He could use some hair gel. He flashes me his killer smile, which works on 90 percent of the girls at school, but I can resist it. I force myself to. There's a bit of that Johnny Flash twinkle in his eye, but it's a well-practiced act. I know he's only in the Chemistry Club because his dad threatened to take him off the team if he didn't get more serious about school.

Mostly at lunch, instead of working on ideas with the rest of us, he'd listen to his iPod and rock out in his chair. The core group of students practically ignored him during the school year, but he did show up at our events, help set up the booth, and go get sandwiches at lunch time. The go-to guy—always ready to leap over chairs and sprint out the door like he's making for the end zone with a football tucked under his arm. Lauren and I shared a few uncontrollable giggles at his bravado, especially when the chairs went flying in his wake. But who we were to judge? People drifted in and out of Mrs. Darby's room at lunchtime, checking out what we were doing, especially when things were boiling on the burners and steaming up the classroom. Not many lasted the whole year, let alone a semester. But Ryan Mitchell spent every Tuesday and Thursday lunch period in that room without fail. Although, Lauren says it's because of me. The last blonde on Earth Ryan Mitchell has yet to woo with his charms. Gag me with a test tube.

"Your cell off? I've been trying to call and text you for, like, an hour already."

I notice sweat glistening on his forehead as he stands under the florescent light. “What did you do—run all the way over here from your house?” He lives in North Estates, the fancy gated community, with his rich parents. Maybe six miles away.

“Biked. Good training, going up your street.” I stifle a grimace. I believe he’s trying to flex his muscles under his football jersey. “I’m on my way to summer camp. “Starts today.”

Camp? I just can’t picture him singing “Kumbaya” or making a potholder out of those stretchy loops of yarn. I guess he spots my confusion.

“Football camp. Boy, no wonder they say blondes are dumb.”

I’ve heard enough of his dumb blonde jokes this year to fill one of those little gift books you find on the rack at Borders. I can see the title now: “One Hundred Dumb Blonde Jokes to Impress your Friends.” Or maybe there is such a book and he bought it. Lauren says he throws jokes at me because I intimidate him. If he calls me dumb, then maybe he’ll feel a little smarter. But I know it’s because I’m his greatest challenge. Catching a sixty-yard pass with two opponents at his heels—piece of cake. Catching Bria Harrison in a moment of embarrassment and imbecility? Priceless. And not gonna happen. I refuse to give Ryan Mitchell any encouragement. This subtle war has been going on between us now for two years. And I know who’s going to win.

“So, what’s all this?” he asks with a sweeping gesture of his hand.

“Crystals. From my mom’s lab.” I sneak a peek at his face and he’s feigning interest. Okay, I’ll let him have it.

“Here’s the thing,” I say. “These are samples of doped crystals—”

Ryan laughs. “Since when do crystals do drugs?” His laugh is really nice and warm, I have to admit. I steel my heart and focus. *Focus, Bria.* I continue.

“To improve the hardness of a crystal, or to create other properties useful, say in solid state lasers, additives called impurities are added to the crystal growing process, called doping. Usually

these are rare-earth ions like neodymium, or like this more common one, which uses metal ions . . .” I lift up a clear box with a three-inch pyramidal crystal inside. “Yttrium aluminum garnet, or YAG.”

“Is that why they’re different colors? I like that cool blue one.” He points, then catches my gaze. “The same color as your bottomless eyes.”

I turn away from him and pick up my mother’s notebook. “Listen to this. It may be the reason for the accident.”

Today, I confronted Allen. After yesterday’s fiasco I put my foot down. It’s tricky enough getting reliable results using time-tried impurities, but unstable elements? When I researched the list of chemicals used in this latest batch, I threw a fit. Some of these heavy elements have a history of volatility and, frankly, no one has ever found any practical application for their use. And you can’t just mix them up like a cocktail and hope you get something that delivers a punch. He registered my complaint, but assured me measures . . .

My voice turns into a mumble as I scan the rest of the page. I easily envisioned Mom chewing out the little bald-headed director whose pasted-on smile drove me nuts the few times I met him at Family Day and other Lab-sponsored events. I chuckle to myself, but as I read the next few paragraphs, my heart pounds hard in my chest. Ryan must have heard the catch in my breath, for he tips his head and bends down to see my face.

“What is it?” he asks, his green eyes bearing down on me. Green as newly mowed grass. I put down the notebook as my mom’s words swam around my head.

“This is too weird,” I say. “I need to check something.”

I reach back into the cardboard box that now sits in the corner of the lab. I pull out a plastic holo-disk holder. About fifty or so disks fill the box, labeled by date. I recheck the entry in the lab notebook and flip through the disks. Ryan watches in silence as I put one in the H-V player and turn on the gel screen. He comes to my side and we both stand there as the visual comes on.

I jerk a little at seeing my mom in her lab coat in full 3-D holo. This was maybe two months ago. She had just had her gray-streaked blonde hair cut short—a little above her shoulders. I remember her constantly trying to tuck an errant strand of hair behind her ears, something she used to do unconsciously when her hair was long enough for a ponytail. It drove her crazy the way the hair kept falling back in her face. She swore never to cut it again. I can see, as she stands there speaking to the camera, the brass-colored bobby pins over each ear. I will myself not to cry. The last thing I need is for Ryan to jump into the role of comforter, feeling a few tears give him the right to slip his arm around my shoulder.

The front door opening startles me. I hear Debby yell through the house. Everyone seems to yell as they come in my front door. Was that odd or the way it worked at everyone else's house, too?

“He's in his room,” I answer. Meaning Dylan. Debby took Dyl to school each morning. Today, Dad would pick him up. If I remember to call and remind him. For the zillionth time I feel impatience over getting my driver's license. *I* would never forget to pick Dylan up. And it really upsets him when that happens. Dylan is obsessive about time and clocks and punctuality. Well, obsessive about nearly everything, but that's part of his illness.

I push the volume button on the remote and hear my mother's voice. Again, I clamp down on my nerves and fight back tears. I raise my chin and watch objectively. I am looking for information, clues. This is no time for sentimentality. Not while in company.

We watch and wait for something to happen. There is my mother, in her white lab coat, near the giant laser controls. This close to the screen, I feel I could just reach my hand through the room and touch her. She stands talking to one of her coworkers, who nods as she speaks. My mom then walks over to the back wall, where a dark screen or fabric hangs from the ceiling. It looks more like a backdrop than a targeting center. I can't say.

Ryan taps his foot impatiently. I imagine he's plenty bored by now. But he watches the screen, then we both gasp at the same time.

"Did you see that?" he says, breathless.

"I don't know." I stop the recording, press the replay button at a ten-second index, then move the action forward in slow time.

"There!" he yells, and points.

I do see it. With my own eyes—just as my mom had written in the notebook.

"Bri, is there any way to enlarge the picture?"

"This isn't live action, Ryan. You can't zoom in. It's just a vid-recording." I can sense him squirm. I know I'm shaking, too. Some things are just too hard for your senses to accept. On a scale of ten, of unbelievability, this is a twenty. Off the charts.

I hear Debby walking around upstairs. Our relic of a house, built in the late twentieth century, has terrible insulation and the old wooden floors squeak. I know exactly where she is by how each board groans under her feet.

We watch as a number of lab workers hurry over to my mom. She echoes my own thoughts.

Dave, did you catch that on camera? Let me see it on the projector.

I can't make out anything being said; such a commotion erupts in the room. I hear my mom's voice raise insistently. *No, I was not holding a pencil. I don't have a pencil on me. It fell out of the air, right here. Hold on.* My mom gestures everyone to calm down while she looks at the camera. The lens goes dark, then we see the replay. Ryan gets his wish as Dave adjusts the projection and we see the event repeat, close-up and personal from the camera's view.

With the action hones in and slows down, we watch my mom walk over to the dark hanging screen. As she stands waiting, perhaps for the laser to fire, a mechanical pencil appears out of nowhere, hovers in the air for a split second, then falls with a quiet clack on the polyurethaned floor.

Ryan stands mesmerized, listening to the volleying of voices. A room of scientists arguing the impossibility of empirical evidence witnessed by a half-dozen people. I pick up the lab notebook and quickly peruse the next few pages. My mom speculated plenty over the following three days, but when I come to the next entry and read what happened, I rush back over to the disk box, pull out another holo-disk dated four days later, then put it in the player.

This time we both stand in complete silence. Perhaps the shock renders us speechless, for what we see boggles the mind. My mother, again standing in the same spot. The laser firing up, the sound of electrical current, humming, buzzing. Six people off to the side, observing. My mom giving a nod, the camera swiveling to show the path the beam would take. I recognize the setup of the Bose-Einstein condensation vacuum used to slow down a light beam as it travels. The camera swings back to the target and, there, a small prick of light bores into the dark screen. Whoever holds the camera this time zooms in close. The pinprick grows to a small hole about three centimeters in diameter. The noise grows louder, and you can tell from my mom's irritated face that the buzzing bothers her. She holds her clipboard in one hand and her pencil in the other. While the hole "burns" through the fabric—and I'm only guessing that is what I am witnessing—Mom leans over to get a closer look. Her hair pulls toward the hole, like iron shavings toward a magnet. It is an eerie sight. She notices a strand pull free. Then you can see the collar of her coat lean toward the burn and the papers clipped to her board flap. By now an obvious suction is at work, slight, enough to make my mom step back, but not before the mechanical pencil in her hand flies toward the hole like a hurtling comet and is sucked inside.

My mom waves her arms wildly, signaling the techs to shut down the laser. Two people run over to her and the loud machine noise lessens. *Shut it down*, my mom yells. Apparently something is wrong. *It is shut off*, someone else yells. My mom shakes her head emphatically as the two lab techs drop to the ground and search. I can't hear over the noise what my mom is saying to them, but I am certain she wants to know if that pencil is anywhere around. As she leans too close to the small hole in

the screen, I see more of her hair pull toward the opening. I gasp at the same time as my mom, as she realizes even with the laser shut down that something anomalous had taken place. I know I've watched too much Star Trek. I can hear Captain Picard say in his British accent, "It's a singular anomaly, no less." Sometimes they called it a "singularity." One of a kind. Something unknown, incongruous, never before seen.

"It's some kind of hole, like a vacuum." Ryan's eyes squint as he puzzles at the sight. "How can that happen? That can't happen, can it?"

I shake my head. "Not that I know of. But you just saw . . ."

I don't know why it takes me so long, but this conclusion hits me harder than witnessing the tear in space. "Ryan, don't you see? That pencil—it's the same one."

I watch the little wheels turn in his brain. He narrows his piercing green eyes at me. "No. That's even weirder. Are you saying that's the same pencil?" More wheels turn. "That was three days earlier. That means . . ."

He lets out a huge breath and shakes his head in denial. But I finish his sentence with a tone of finality. "The pencil moved in time. Backwards. My mom created a time rip . . . or something."

This is too much for Ryan's mind to wrap around. To be honest, I am thoroughly befuddled as well. This will take some mental adjusting. I need a root beer float.

My thoughts are intruded by Debby's yelling, this time from the kitchen. "I can't find him."

"Try the closet. In his bedroom." Dylan has taken to sitting in the closet for hours at a time. Yesterday, I peeked in there and joined him in the dark. We sat for a while, perhaps an hour or so. I made small talk, like I do with him when he's quiet. Not because I'm uneasy or anything. I often imagine Dylan hears me, wherever he's gone to, and like to think my voice is comforting somehow. Sometimes I make up stories; other times I talk about school and my friends. Most of the time he doesn't react at all, but every so often he'll say a word or two. Yesterday, I remember what he said

when I told him I would take him to the public swimming pool at three o'clock. He took my hand, there in the dark as we sat side by side, and said, "I hear him sniffing."

"Who, Dyl? Who is sniffing?" I listened hard but heard nothing but Dylan's nasal breathing.

He didn't say. Just squeezed my hand with his small soft fingers and stood. We exited the closet and that was that.

I hear footsteps tromping on the stairs. "Bye," Debby yells, with the door slamming after her. I listen to the sound of her car rattle down the driveway, then turn to Ryan as the room grows ominously quiet.

Ryan whistles and looks at his watch. He's about six feet tall, towering over my five foot five inch height. He's all muscle and bronzed and probably pays a high-class stylist to have his hair cut each month. A stylist, not a barber. His parents bought him a Hydro-BMW—new—on his sixteenth birthday. A chick magnet, baby blue.

"I gotta go," he says. "If you're late, they make you do ten laps around the field." I have a hard time switching my attention away from the holo-image to the beck and call of daily routine.

I nod and for a brief moment we share an unspoken thought. *A rip in time.*

He takes a quick glance at the screen. I have it on pause, and my mother's face reflects the amazement and denial we both clearly feel in that room at that moment.

He lowers his voice, as if afraid to speak the unspeakable—mysteries and magic and forbidden dark knowledge. "I'm coming back later this afternoon. I'll call a few of the others and maybe we can figure this out."

He reaches out to touch my hand. This time I let him, seeing as we had shared a special moment. I get the feeling it comforts him more than me. "Maybe you're right, Bria. Maybe there's more to the accident than what we were told."

My mind buzzes as I seek to process what I had just seen. All I can do is nod and watch Ryan bound up the stairs. The basement, warm and still, seems to have a life of its own, pulsing with revelation and surprise. I remember the root beer float.

As I sit on the counter sipping my float and breaking up the lumps of vanilla ice cream with a spoon, I look out the window at the sunny, ordinary day. Cars whizz by, people walk their dogs, someone is dragging their empty trash can back up their driveway, and I hear a lawnmower rev up. The incongruity of normal life and what I have just seen rattles me. I down the dregs of my float, and for the rest of the day, bury myself under the bedcovers and listen to the comforting beat of my heart.

Chapter Three

“As far as the laws of mathematics refer to reality, they are not certain, and as far as they are certain, they do not refer to reality.” –Albert Einstein

Harnessing the energy of the sun and stars to meet the Earth’s energy needs has long been a scientific challenge . . .

I’m playing an interview of my mom, taken back in March, when the government dumped a few billion dollars of research money in the DOE’s lap. I glance up from the mounting table as I adjust and tweak the focusing lenses according to the diagram in her notebook. I know I don’t have any of the sophisticated equipment she used at GNL, but I do have three samples of the crystal she used during that pencil incident. I’m taking an educated guess that a different doped crystal was responsible for the accident, that I’m safe working with the ones marked KDP-01-FR-35-UUB, which I can only guess indicates the saturation formula.

While a self-sustaining fusion burn has been achieved for brief periods under controlled experimental conditions, there was no energy gain, which is essential if fusion energy is to supply a continuous stream of electricity . . .

My mom’s droning comforts me; I imagine she’s there, guiding my hands and thoughts. *Show me, Mom. Show me what happened to you.* I review her notes and match the diagram with the three-dimensional replication I’ve just constructed. I also have a holo-clip on the plastex screen from the disk, but the angle is skewed and doesn’t help me much. Then I take a big breath and dim the lights. I

stand there and listen to the silence, thick silence. This starts me thinking about space and energy and vacuum pressure. And dark matter.

. . . is called 'the equation of state.' That is, the ratio of pressure that dark matter puts on the universe to the energy per unit volume . . .

The interviewer, I notice, has a really bad haircut. He leans across the table with keen interest in my mother's words, nodding his head and urging her with his eyes to continue. Whoever did his makeup for the segment put too much base on his cheeks. But my mom looks good—young for her thirty-five years. A few laugh lines around her mouth, but, then, she likes to laugh. People remark often on how funny it sounds, like a cross between a guffaw and a snort, when she really gets rolling. Dylan has her laugh, and he's just as ticklish, putting Dad and me at an advantage in a tickle fight. There are just a few spots where I don't like to be touched—right above my knee and the bottom of my feet. My family learned early that they get a reflexive punch if they stray too close to my keep-out zones. I can't help myself. One time Dad pinned me down and went for both feet. I bent my knees and belted him in the gut, sending him flying off the couch, where he smacked his head against the floor. Good thing our living room is carpeted.

So, there is no reason why we shouldn't expend all efforts to tap into this dark energy and harness it. Like solar and wind power, we have at our fingertips an unlimited supply . . .

I know I'm stalling. I pick up the remote and pause the interview, leaving the camera focused on Mom, a close-up. Her eyes are filled with excitement; she wants to infuse the world with hope, a world going insane over the last remaining barrels of oil. In my short sixteen years, I've witness riots, coups, and outright revolutions. Russia, China, the Middle East—ceaseless conflicts, threats, economic sanctions, while the entire world scrambled to adapt, modify, and restructure their companies and countries to an inevitability they saw coming fifty years ago. I remember when they switched over the first gas station in Greenfield—took out all the pumps and put in the rows of charging stations, lined

up like tombstones. At first, people brought their cars to the shops and had the engines converted. You can still see a few of the old vehicles on the streets, now considered vintage or antiques. Dad has a picture book of all the cars made throughout history, from the first early Fords to the current hydro-hybrids. It's shocking to see how big some of those cars were—like Hummers and something they called SUVs. You could pack six people in some of those giant gas-eaters!

But people around the world, especially in affluent countries, were used to a decadent, consumer lifestyle. And in America, no one wants to give up comfort and luxury. No oil, no problem. Once dark energy is harnessed, it will make up what solar, wind, and hydrogen cells lack. Too many people and not enough energy. It seems to me we should just limit population growth, but that's not going to happen. At least, not by choice. China set the example, but short of criminalizing and jailing people who have more than two children, in America, families are fined. Do they care? So the rich are the ones who end up with six kids and the poor go to jail and lose their homes because they can't pay the penalty. But I'm digressing.

And stalling. I flip the switches. Equipment hums. As the laser warms up, I hear Lauren Hodges outside. She's calling my name and the doorbell rings. I blow air through my nose, like a racehorse at the gate, and finger the power switch. I pretend I'm not home, but I forgot about Ryan.

"She's down in the basement, come on," he says.

"What's down there?" My eyebrows raise at the voice. Jace Riggs. What's he doing here? Before I have time to sort through the voices, a herd of elephants pounds the steps, shaking the walls. I'm surprised when I look over and there're only the three of them—Ryan, Lauren, and Jace. Maybe their combined force exceeds their mass. Ryan stops abruptly and the other two slam into his back.

"Nice warning, vape head," Jace says, pulling his stringy jet black hair out of his face. Even in the dim light I can see his eyes are puffy from lack of sleep and who knows what else. Lauren, with her mousy brown hair and mousy face—she even has a slight overbite that lends toward a rodent

appearance—separates herself from the guys and retreats to the back wall. I'm thinking she's always had a gravitational resistance away from other humans. Shy, quiet voiced. And I didn't mean to imply she is ugly. In fact, she really has a pretty face, but rallies zero confidence. From her occasional participation in problem-solving during our Chem Club meetings, I'm guessing her IQ makes mine pale in comparison. She can do equations in her head like nobody can, even multiply triple digits and—I'm not kidding—figure out square roots without a calculator. But her brilliance is her best-kept secret, and I know why. No one likes a smarty-pants girl. That's where she and I are well met. She's a freshman, but I wonder why she doesn't fast-track and graduate already. She's got to be just as bored with school as I am. But I don't know anything about her family or her goals. Like I said, she's pretty quiet.

Jace brings out some kind of nurturing instinct in me; maybe it's because he draws back whenever I try to talk to him. He's suspicious of my gesture of friendship. He sits in the back of many of my classes, doodling, tapping his feet, nodding off. Mostly nodding off. I've heard stories, but I can't tell you how true they are. Parents going through an ugly, violent divorce. An alcoholic father who beats him. Ryan once told me he saw Jace wandering the downtown streets after two a.m. and offered to give him a lift. Jace said thanks but told him it wasn't safe to go home. At least, that's how Ryan relayed it. I don't expect Ryan took him to his fancy house and gave him the guest room for the night. Knowing Ryan's parents, they'd throw a fit. They'd make Jace wash, shave, and cut off all his hair before he would pass muster enough to be allowed through the front door. I've met Ryan's parents. Snobby is too kind a description.

Jace asks questions about what I'm doing, and Ryan does a fair job answering, no doubt wanting to impress upon me that he heard my earlier oration. After a quick hello, I turn my attention back to the laser.

Ryan holds up his hand like he's asking the teacher a question. I raise my eyebrows at him.

“Well, I just want to know—is this safe? I mean, your mother did blow up the lab.”

I give him my death look and he shrugs apologetically.

“Do you want some help?” Lauren asks in her squeaky voice.

I turn and can't tell if she's nervous being in my house or scared of turning to ash. “There's really nothing to do,” I answer.

I throw a few switches on the equipment and watch. The light catching in the crystal mesmerizes me, as it always does. In my non-linear crystal experiments, the light morphs and changes frequencies, like plucking a guitar string in just the right spot to create a higher pitched harmonic. It's akin to alchemy, seeing a red light turn green before your eyes and realizing colors are just waves, like music. Everything is a wave—unless you're a photon. Then you can be a particle too. Photons have split personalities.

The beam travels through the crystal and hits the wall. But I'm seeing something I shouldn't, and it's not positioned at the wall, but a foot in front of it. As I walk over to study it, I notice the floor shaking. Not a lot, just barely. Maybe it's a big truck on the road below the house. Ryan looks at the wall to his left. I see movement. A tremor? Jace and Lauren huddle behind big, protective Ryan. It's almost humorous, but I understand. Let the big guy catch the brunt of the explosion. His parents can afford the plastic surgery, if needed. I look back at the spot that caught my eye and I do a double take. I hear something and it sounds like a muffled roar, like a river in the distance, or a wind ruffling tree branches. It's very quiet but persistent.

I inch closer and I'm about a half-meter away. In the path of the laser beam stands an obstruction. That's the only thing I can think to call it, for the light stops here. It never reaches the wall. On closer examination, I see a tiny pinprick of a hole. Okay, I know it can't be a hole. A hole in space. But light goes in and doesn't come out. That's what happens in a black hole where the gravity is so great, it sucks everything, even light, into its center.

But no way I've created a black hole in my basement.

"Bria—" Ryan starts, his voice chock-full of ominous warning. Calmly he adds, "Turn off the laser."

I nod, but I can't move or take my eyes off the tiny hole. And now it looks like it's expanding.

I hear Jace and Lauren make noises of concern. There's mumbling and cursing and other assorted sounds. I feel air slide past my cheeks and my hair falls into my face. In this instant I know exactly three things: that I've re-created my mom's experiment, that I'm staring at a rip in time and space, and I'm in serious trouble.

I rush back and shut off the laser. The others sigh collectively. I have no right to blow up my friends or my house. Although I believe deep in my heart this trial poses no danger. This is not the crystal my mom used in her final experiment. The lab notebook doesn't show that perilous day's entry, as she always wrote up her notes after the fact. But it's safe to guess she had moved on to some other crystal samples on the list. I hope.

Lauren's fearful tone makes me swing back around. "Bria, it's still there!"

Sure enough. Ryan and Jace close in on the hole, but I yell at them to stop.

"Don't touch it! Or even get too close."

Ryan throws up his hands. "Now what? What if it doesn't go away? What if it starts to suck everything in, until your whole house, your neighborhood, hell, even the whole world disappears?" I can tell he's on the edge of panic.

I look at Jace and he's studying the hole from all angles. "I don't get it," he says. "You can see it from the other side, too." He shakes his head in confusion.

It does boggle the mind. At this moment, a surge of excitement courses through my whole body. This is beyond amazing and outrageous. Beyond even impossible. If I hadn't seen the holo-clip

first, I'd have a brain meltdown. But now, I'm trying to remain calm and not jump up and down in hysteria.

I can tell Ryan is sensing this too. A smile sneaks up one side of his face and he clears his throat. "Maybe we should . . ." He points at my pencil.

"No way," I say. "I'm not putting anything in there. We don't know if this goes backward or forward or what." I add, "Or even if this is a time rip."

I get the feeling Ryan had told Lauren and Jace all about this morning's discoveries. They nod in agreement as if they understand what madness I've wrought in my basement.

"Look." Jace points from behind the hole in space. "It's shrinking."

"I wish we had a camera and could photograph this," Ryan says.

Jace pulls out his iPad and aims. "Shine a light on this thing. Do you have a better light?"

I turn up the florescent, but it makes the hole harder to see. I shrug and Jace takes a number of photos. "I don't think these will come out," he says.

"I've got a small movie camera. Next time—"

Ryan butts in with some strong feeling. "Next time? You've got to be kidding, Bria."

I ignore him and get close to the rip, feeling braver now that it's only a centimeter wide, compared to the three centimeters it was just moments ago. I wave my hand slowly in front of it and feel a slight current heading into the hole. Then my head starts to pound and I get grumpy.

"Don't you get it, Ryan? I have to find my mom."

"But, Bria," Lauren starts apologetically, "you know your mom is gone."

"Shut up," I say, wondering why I am so snappy. "She's gone, but she's alive and I'm going to prove it."

“You’re being stupid, Bria.” Jace’s tone turns mean and I’m shocked. I’ve never heard him express much emotion. “This is reckless and you’re going to hurt someone. How will your father feel if he comes home and finds you in little pieces all over the basement?”

“Fine!” I yell, now totally irate and ready to punch someone. I don’t know what’s come over me. Maybe I just haven’t cried enough. “Just leave. You guys don’t understand.”

Even Lauren huffs and shows a look of disdain and judgment. She whips her head around and starts up the steps. Jace throws me a sour look and follows after her. Ryan just stands there, his mouth dangling open. I wave him away and plop down in the swivel chair.

I hear him tromp up the stairs as I bury my head in my hands. A hush falls over the room as the laser hum dies out. But there is something in the air—a residue that feels ugly and sticky and makes me want to scream.

Empty space. Thin air. *People don’t just vanish into thin air, Bria.* I rub my fingers together, then wave them around, testing the air, feeling for something, anything.

Air is *not* thin. Space is *not* empty. Something got sucked out of this room and something else replaced what was taken away. You cannot have a vacuum in space. The cosmological constant proves it. My mother proved it.

Now I have to prove it.