MIND-BODY SEPARATION

Chapter 1

Chuck Trunks

Break a Leg

“Ten minutes to showtime, people!” shouted Bruce from across the packed classroom. “In ten minutes, we’ll be broadcasting to the entire world!” The unflappable MSNBC television director wearing a faded Hawaiian shirt rotated on the heels of his worn New Balance sneakers, stopping as soon as his eyes found mine. Despite the dirty-blonde man bun, scraggly beard, and random skin doodles, I was surprised by how easy it was to both like and trust the thirty-something-year-old. After all, I had only one shot at this. Bruce Warner was not only competent, but he was also a calming force to everyone involved. No wonder the bigwigs at Comcast tapped him for the job. He made a beeline toward me, zigzagging between the yellow-topped desks and smiling at the upturned faces of the excited children.

He reflexively covered the headset’s microphone with his free hand since the other was cradling an iPad against his chest. He leaned in and asked, “How goes it, Dr. Chuck? All set to stun the world?”

Bruce was the only person I didn’t mind addressing me as Dr. Chuck. I preferred Chuck or Mr. Trunks because anything with “doctor” in it sounded pretentious and self-indulgent. After earning two PhDs, one in molecular biology and the other in theoretical physics, including a handful of honorary degrees and distinctions from various institutions in the United States and Western Europe, I was well past the need for further recognition or validation. In fact, I was sick of it. At 61 years of age, I simply wanted to offer my fellow human beings something to seriously ponder before my relevance completely ran out like sand through an hourglass. In other words, the end of my 15 minutes of fame was fast approaching. “C’mon, Bruce. You know I was born for this, right?” I replied. “The better question is why are you dressed like you skateboarded here?”

“Good. Good,” he said absently, obviously missing my little joke; his eyes were focused on what was behind me. “I’m never going to get used to that thing,” he continued. “It looks like a pool table wrapped in polished stainless steel. And what’s *that* strange gizmo next to it? I hadn’t seen that before.”

“The High-Performance Atomic Spectrophotometer—er, I mean the ‘pool table’—is where the magic will happen this afternoon, but it won’t work without Google’s quantum computer, Willow,” I replied. “It’s the fastest of its kind on earth with 105 qubits. It can complete tasks in less than a minute that would’ve otherwise taken more than 10,000 years.”

Bruce stepped in front of me as if he felt safer having something between him and the space-age apparatus behind me. “Spare me the mumbo-jumbo, Dr. Chuck,” he chided. “To me, it looks like the pool table made friends with an eight-foot-tall jellyfish trying to disguise itself as a chandelier. The whole ensemble totally creeps me out.”

“Hey, I like that description of the quantum computer! The kids will love it. I think I’ll use it today,” I joked.

“Just stick to the script, Dr. Chuck.”

In a more serious tone, I inquired about the status of the one and only guest I’d have on during the 90-minute presentation. “I take it that the star of the show is already here, yes?” I asked.

“Yes, Mrs. G is with her doctors and family in the principal’s office as we speak,” he answered while holding my gaze. In less than two weeks of working with Bruce, I’d come to view him as a stickler for details and a man of rare emotional depth.

And with that, the award-winning television director slapped me on the shoulder of my sport coat and walked toward one of the cameras stationed midway against a curated wall of belated Halloween decorations and assorted fifth-grade artwork. A second camera dominated the center of the room. A third, operated by a single cameraman, was a handheld unit designated as a floater for the all-important close-ups. For now, I remained perched on top of my stool, knowing I'll begin to pace back and forth once I start lecturing. When Bruce suggested removing it during rehearsals, I quickly defended the wooden stool, which looked freshly pilfered from the stage of a local comedy club, telling him, "No, no, leave it here. I like having options."

While Bruce circulated through the buzzing classroom, gathering last-minute assurances from his production team leads, I peeked over the top of my handwritten notes at the group of 10-year-olds in kid-sized desks facing me and their parents seated in adult-sized plastic chairs behind them. Temperature highs and lows in Southwest Idaho in early November were always a challenge to pin down, especially for the recent influx of transplants from California and Arizona, which explained why so many of the parents sat with big, puffy coats either draped over the backs of their chairs or folded across their laps. Whereas the children's faces were painted with expressions you'd expect to see on a snowy Christmas morning, their parental counterparts presented a mixed bag of nervous smiles, jittery eye movements, and sporadic facial tics. Their expressions ranged from "I'm giving my little princess a once-in-a-lifetime opportunity" to "What kind of lunacy am I about to expose my innocent little boy to?"

"Two minutes, people!" shouted Bruce, jolting me from my thoughts.

His booming voice in such a cramped space, coupled with the sudden change in lighting, had a sobering effect on me. What may have looked like a momentary case of stage fright was actually an internal shudder stemming from an undeniable

truth. Deep down, I knew what to expect—that most of the viewing audience will hate what I have to say.

It's Elementary

"Let's imagine for a moment," I said in my best Carl Sagan voice, "that you and I were sitting comfortably on an asteroid, looking at the jewel-like Earth Stone. From our vantage point, the Earth would appear as small as a glass marble if you were holding it in your fingertips at an arm's length away—no larger than your thumbnail. We'd see the sun and crave its warmth since we're so far away. Without Earth's atmosphere obscuring our view of the heavens, we'd be able to see the crispness of the chalk-white moon and numerous blinking satellites orbiting our shimmering blue home. We'd have planned for the bitter cold and absolute silence, but not for the lack of inky blackness we grew to expect of outer space. In fact, it's just the opposite. Light from countless stars in countless galaxies radiates in every direction, illuminating a universe teeming with an array of celestial bodies, from planets to moons, comets to meteorites, and black holes to colorful nebulae clouds."

I had their attention. Who wouldn't be able to imagine what I had just described? A lecture that hinged on the listener making small leaps of faith with me fared much better if I began with the big picture first.

"It's a peaceful image, isn't it?" I said, casually sliding off my stool. "Hello, everyone. My name is Chuck Trunks, and contrary to what the internet and social media had to say about me after my interview with Anderson Cooper on *60 Minutes* last Sunday, I don't think of myself as a 21st-century Willy Wonka, nor do I believe that I'm standing in my very own chocolate factory in front of a group of schoolchildren holding golden tickets to today's events. I specifically chose Pine Branch Elementary to deliver this presentation for two simple reasons. First of all, I believe in exposing children to avant-garde ideas *before* their sense

of wonderment and creative minds are silenced through repetitious dogma, systematically pounding square pegs through round holes. It's 'mission accomplished' when the next generation blindly accepts—without question—what came before them. My apologies, Principal Reid. Secondly, I don't live very far from the school, and I'd like for the City of Nampa to be known for something other than crumbling strip malls, urban sprawl, soul-crushing traffic, and agro-industrial hellscapes. No disrespect, Mayor Campbell."

I stepped toward a nearby counter and reached for one of the pre-opened water bottles. Just before taking my first sip, I noticed a blinking red light on the side camera—my cue, according to Bruce, to face that particular camera when addressing the television audience. Instead, I returned to face the kids and parents and asked, "Wouldn't you like to make sense of the entire universe and everything in it so you could understand your reason for existing? You didn't ask to be born. None of us did. You just happened to show up one day. Then, when you were like five or six, perhaps your mom and dad sat you down after losing a beloved grandparent and gently explained that life itself comes with its own bubble-popping fine print? Maybe an older kid, sensing your immaturity, blurted the inevitable truth to you in the middle of a neighborhood game of kickball? At least that's how *I* found out. When the game ended, I walked home shellshocked, asking myself, "What's the point?"

A little girl wearing a pink and white dress raised her hand excitedly in the front row. Her expression clearly said she had something important to share. "Yes, Amy. What is it?" I asked.

"My grandpa died two days after Easter, and he's in heaven now."

Of course she nodded solemnly after I obligingly asked if she still misses him. "Well, Amy, I think you might feel a little better about his passing by the time

I've finished my talk this afternoon," I continued. "In a way, you might even feel closer to your grandpa even though he's gone."

I returned to the stool and placed the water bottle on the seat. Next, I asked everyone to return to the mental images they created in their mind's eye when I described our stellar view of the cosmos from the asteroid. After a short pause, I dropped the first of many surprises. "Everything you see—and I mean *everything*," I began while gesturing toward the periodic chart on the wall behind me, "is comprised of various combinations of only 118 different elements—including the orbiting satellites, the Earth itself, and everything *on* Earth. And in case you're wondering, birds, fish, trees, butterflies, bicycles, clouds, air, you name it—even you and me—are an assortment of these same 118 elements."

I stepped closer to the kids in front of me and asked, "Can anyone name an element for me?"

"Gold!" shouted a boy with dark eyes and a wild mop of curly brown hair.

"You're right, Jeffrey. Good job."

While looking over his shoulder at his mom, he shouted, "Silver!"

"You're on a roll, Jeffrey." I looked at the parents in the back and joked, "I guess we all know who's going to own a pawn shop someday, huh?"

From the corner of my eye, I saw Bruce give me a thumbs up on the impromptu joke, followed by a rotating finger motion, telling me to speed things up. Although I had forfeited my compensation and raised enough money to ensure there wouldn't be any commercial sponsors or disruptive ads during the entirety of my presentation, I still had to adhere to a definitive time limit. Just another reason to appreciate Bruce.

An arm the color of alabaster shot up from the middle of the desks, waving with urgency. “Do you know another element, Phillis?” I asked.

“Water,” replied the blonde, blue-eyed girl who could easily pass as Principal Reid’s granddaughter.

“Water isn’t an element, Phillis,” I said as I retrieved my water bottle from the stool behind me. While holding it up in front of the fifth-graders, I explained that just as salt is composed of only two elements, sodium and chlorine, water is comprised of hydrogen and oxygen. “Salt and water,” I continued, “are called compounds, which means they contain two or more different elements. Sugar has three elements, but the box of baking soda in your fridge has four. Isn’t that intriguing? Again, those 118 elements organized on the periodic chart are responsible for all visible matter in the entire universe. Think of them as the ultimate Lego set.”

When Bruce gestured that they were getting ready to bring out Mrs. G, I nodded and quickly moved on to the last thing I wanted to say about elements. “Now that we’ve identified a few elements and know what constitutes a compound, we need to understand what makes an element an element. According to Google, an element is a pure substance made of only one type of atom and cannot be broken down into simpler substances by chemical means. So, if I dropped a gold brick on the table in front of you, you’d know that it’s totally comprised of gold atoms, each identical to one another. To give you an idea of how small an atom is, one grain of salt has around 600 trillion sodium atoms and 600 trillion chlorine atoms. That’s 1,200 trillion atoms in total! Now does anyone know how many billions are in one trillion?”

A baritone voice from the back shouted, “One thousand!”

I was surprised to hear an adult's voice responding, figuring everyone understood I was directing all my questions to the students. "You're right," I replied and added, "Isn't that mind-blowing?" Without waiting for a response, I stepped back and stood in front of the quantum computer's control panel. While typing in a command, I half-turned toward the side camera's blinking red light and said, "If you think *that's* mind-blowing, wait until you see what *this* baby can do."

Goodbye Mrs. G

Meanwhile, as the peculiar-looking quantum computer began to power up, mesmerizing everyone in the room, I took the opportunity to explain some of the fascinating features of Google's Willow, citing my book, *Physics from the Heart: A Quantum Story*, as an excellent source for the layman. As if cued to do so, a collective hush fell over the room as a thin cloud of light stretched across the flat surface of the High-Performance Atomic Spectrophotometer, aka, the pool table. A clicking noise emerged from the hissing computer, reminding me of the sound my stove makes right before the gas is pleasingly ignited into a circular blue halo. While Willow dutifully worked through its internal diagnostics, I walked around the H-PAS and stood behind it, marveling at the thin layer of light wafting from one end of the tabletop to the other like an advancing sheet of dry ice.

"Since we're a few minutes ahead of schedule," I announced with an impish smirk, "who's up for a game of air hockey?"

After the laughter died down, I returned to the front of the room and peered into the glassy eye of the center camera. It was time for the most sensitive part of the demonstration—one that required the brain's prefrontal cortex's penchant for reasoning rather than the hippocampus's ability to imagine. In other words, I would need the people in this classroom and the worldwide viewing audience to be open-minded and receptive of scientific fact. Although everything I was about to show the world had been duplicated at much smaller scales in various

laboratories across the globe over the last several years, no one had attempted to subject a living, breathing human being to the power of the H-PAS—especially over a live broadcast.

"I'm sure most of you are aware of what's about to happen," I began. "Some of you have compared me to the late pathologist Jack Kevorkian, a man who assisted in over 100 suicides, one of which was broadcast on *60 Minutes* in 1998. Yes, someone will die on the H-PAS this afternoon, but I won't liken it to 'assisted suicide.' Whereas actress Gwyneth Paltrow referred to her divorce from Chris Martin of Coldplay in 2015 as 'conscientious decoupling,' I see today's demonstration as 'conscientious expiring.' Of course, the most difficult aspect of making this groundbreaking presentation a reality was getting all the necessary blessings from a litany of agencies and, most importantly, the McGillicuddy family. But before we bring out 93-year-old Mrs. G, the cherished matriarch of the McGillicuddy clan, I'd like to say a few words about the Idahoan native."

Telepathy or instinct made me look at the rear of the classroom just as Bruce held up his hand with all five fingers splayed, warning me that Mrs. G would be making her entrance in a mere five minutes. I returned my gaze back to the parents and their kids, relishing the opportunity to speak highly of a woman whose lifelong stature as a selfless humanitarian was disguised within a five-foot frame weighing in at less than a hundred pounds.

"Rose Emily Ballard was born and raised on a 270-acre potato farm in Blackfoot, Idaho, in 1933. After marrying Horace McGillicuddy in 1952, the newlyweds settled here in Nampa, where Horace worked for the Union Pacific Railroad while Mrs. G tended to their five children. After Horace died in 1993 at the age of 63, Mrs. G, a self-taught accountant, continued to keep the books for two food processing plants in nearby Caldwell well into her 80s. Not only did she outlive her husband of 41 years, but Mrs. G also survived the tragic losses of three of her adult children. Soon after I began searching for a volunteer for today's

monumental exhibition, I came across Mrs. G's application. Out of the 17,000 that were submitted, I chose to work with her and her wonderful family because they possessed most of what I was looking for—a full understanding of everything that would happen here today and an ironclad conviction to aid in the betterment of all mankind; plus, she has a terminal illness with not much time left on the clock."

Suddenly, half the overhead lights went dark, something I had asked Bruce to do the moment Mrs. G was brought into the room. It was less of a cue and more out of respect for her and her family's act of courage and sacrifice. Besides a sedated Mrs. G, three others entered the subdued fifth-grade classroom: two nurses, one at each end of the gurney transporting Mrs. G, and her doctor, a hyper-focused Indian man who looked younger than Bruce, pushing a cart of sophisticated monitoring equipment tethered to the motionless white-haired lady. Having practiced the choreographed ministrations numerous times during the prior week, they knew what to do, wasting no movements while maintaining impassive expressions. After gently placing Mrs. G's fragile body on the H-PAS, the nurses exited the near-silent room, taking the empty gurney with them.

As Mrs. G lay with a thin white sheet covering her body from the neck down, Dr. Gupta centered his attention on the pulsing digital readouts from the humming equipment charged with monitoring her brain, lung, and heart function. I stepped aside after introducing the Stanford graduate to allow a professional medical doctor to explain the particulars of Mrs. G's present condition without disclosing the source of her affliction.

"Earlier today," he began, "Mrs. G was removed from life support after spending a couple of hours with her family and a few close friends at St. Luke's hospital. During those precious hours, she was lucid, animated even, despite the enormity of today's events. As of now, she is very much alive—as you would be if you were put under while your dentist removed your wisdom teeth—but without her

medication, her ventilator, and her ventricular implant, Mrs. G will pass away in about three minutes."

"Dr. Gupta," I asked, "would you please prepare the H-PAS?"

Without a word, the Mumbai native removed the sheet from atop a peaceful-looking Mrs. G, folded it, and placed it on the cart. Next, he unclipped the spaghetti-like tendrils from her naked body, disconnecting her from the monitoring equipment. He turned toward the quantum computer's control panel and pressed a flashing green button. As the thin layer of foggy light evaporated from the tabletop, I looked at the little girl who had lost her grandfather.

"Amy, would it be alright if I asked you to help me with this next part?"

Surprisingly, she didn't turn around to look at her parents for cautionary approval. Instead, she stood up from her desk, smoothed out her dress, and bravely walked to the front of her classroom.

Weight of the World

"Now we need to act quickly," I urged. "Amy, would you please go to Willow's control panel and type in capital Q-C-M, backslash, followed by a lowercase *a*?"

Amy stepped past me but stopped when she looked at the nearly translucent old woman. "Why is Mrs. G naked?" she asked.

"Because we're going to weigh her," I replied. "The H-PAS is equipped with a quartz crystal microbalance that's sensitive enough to measure the weight of a single atom. You certainly wouldn't need something like this as your bathroom scale, but it's critically important for what's going to happen next."

After she finished typing in the command, a flashing yellow button appeared on the control panel's computer screen. She looked at me for further instruction. "Go ahead and press it with your finger, Amy, and tell me what comes up on the screen," I said.

"I see the number 98 with a whole bunch of digits on the right side of the decimal point," reported Amy.

"How many digits?" I asked. "Can you count them, please?"

I caught Dr. Gupta's eyes while Amy counted each decimal place. Without saying a word, I knew he was telling me that Mrs. G was soon to pass.

"24," announced Amy.

"Good job," I replied. "What that means is that the H-PAS, with help from Willow, weighed Mrs. G to the septillionth place—an atomic level of accuracy. Again, the H-PAS is so high-tech, it can detect and weigh a single atom. I don't know about you, but I think that's incredible."

Dr. Gupta began reattaching the cuffs, clips, and patches of the monitoring equipment to Mrs. G's body, making Amy think that was her cue to return to her desk. I stopped her mid-stride and had her stand next to me while the doctor checked Mrs. G's vital signs. After 20 seconds, Dr. Gupta disconnected the electrodes and shook his head. She was gone. After a full minute of silence, Mrs. G's doctor somberly coiled the monitoring cables on top of the medical cart and pushed it toward the exit. All eyes were on him as the squeak of the cart's caster wheels on waxed linoleum followed him out the door.

“Amy,” I said, “I know it’s strange to be up here next to a corpse, but time is of the essence. Would you please type in capital Q-C-M, backslash, followed by a lowercase *b*?”

While Amy bravely did as I asked, I took a moment to survey the ultra-alert wide-eyed kids, who could hear and see everything. I couldn’t imagine a video game like Minecraft or Fortnite enrapturing their minds more than what they were witnessing on the H-PAS.

“Should I press the flashing yellow button again?” she asked.

“Yes, and tell me what you see.”

“I’m seeing the same thing as last time: the number 98 with a whole bunch of digits on the right side of the decimal point.”

“That’s good,” I said. “Now type in capital D-I-F, backslash, lowercase *a* minus *b*, and tell me what you see.”

“It says zero,” she replied.

“Excellent, Amy. You did a terrific job. You may take your seat now, but I’ll need your help again in a few minutes.” I scanned the little faces looking up at me and continued. “In fact, I’ll be needing *many* of you to come up and help me.”

It was easy to pick out who Amy’s parents were as she made her way back to her desk. Dad was giving his daughter a thumbs-up while her proud mom blew kisses and dabbed the corners of her eyes with a tissue.

“What Amy and I have just demonstrated,” I began, “is that Mrs. G weighs exactly the same only moments after her passing as she did when she was alive—

right down to the very last atom. ‘Why does that even matter?’ you may ask. It matters a lot. Remember when I said that all visible matter within the entire universe—which includes human beings—comes from the 118 elements on the periodic chart? Well, the late Mrs. G is no exception. Although the average human being is comprised of around 60 different elements, only 21 are considered biologically essential, like potassium, calcium, sodium, magnesium, iron, and zinc. However, 96% of a person’s total body mass comes from only four elements: oxygen, carbon, hydrogen, and nitrogen—with oxygen alone accounting for a staggering 65%. When we look at the dearly departed woman on the H-PAS, we see all of her atoms arranged into a form we can all recognize, but what if we could indulge our obsessive-compulsive nature and reorganize all of Mrs. G’s atoms not by body part but instead by element type?”

A stirring in the back of the room made everyone turn to look. “In a few moments,” I announced, “you’ll be needing the eyewear being handed out by the production staff. Don’t worry. You’re not in any danger. These dark glasses are like the ones you get from the eye doctor after a dilation. It’s just a precaution that the TV audience needn’t be concerned about.”

When I caught my little helper’s eye, I waved Amy over and handed her a pair of shades. I had her stand next to me while we waited. I looked down at the top of her head and whispered, “Are you okay with being up here?” She looked up and nodded enthusiastically, making me think of how shy and distrusting I was at her age. Once the room had quieted, I took center stage again and began to explain what was going to happen next.

“Amy is going to start the atomizing sequence that will rearrange Mrs. G’s atoms from biological function to specific element types. When the dust settles, so to speak, we should be left with around 60 different piles, if you will, of elemental atoms. I’ll warn you now that many of the piles won’t be visible to the naked eye because a lot of elements appear in the human body in only trace amounts. For

example, we should be able to see a small atomic pile of calcium, which constitutes about 1.5% of the average person's body weight, but since iron's percentage is only 0.005%, we won't be able to detect that particular atomic pile with just our eyes."

Approaching from my right, Bruce's third camera operator moved in to frame and capture the impending metamorphosis in ultra-high-definition with his state-of-the-art handheld. His sudden presence startled my seemingly unflappable assistant with hair ribbons that matched the pink and white flowers on her dress.

"It's okay," I said reassuringly. "I need you to type capital D-N-A, backslash, followed by lowercase f-l-u-x, and tell me what you see."

"Something's wrong," she answered. "I must have typed the wrong thing because the screen is totally black."

"That's fine. Just wait a few seconds. What's happening now?"

"A flashing white circle just came up," she replied.

"Perfect. Go ahead and press it with your finger. Then put on your glasses and come stand next to me."

The H-PAS Has Spoken

At first, the vibration beneath my feet was no different from what I'd feel while standing in a moving elevator. Suddenly, the classroom lights began to flicker randomly. Since cell phones weren't allowed, only the monitor above Willow's control panel glowed steadily. Across its cerulean blue surface, a mixture of strange symbols, complicated mathematics, and 3-D vector diagrams disappeared as fast as they popped up on the illuminated screen. As a blanket of misty light

began to fill the stainless-steel tabletop, enveloping Mrs. G's lifeless body, the needling vibrations downshifted into lower-frequency thumps I could feel in my back teeth. They say that our sense of smell is the oldest of the five senses and that it can trigger the most vivid of memories. Instead of staying focused on the atomizing sequence, the acrid scent of inorganic solvents took me back more than 25 years to a time when I dismantled an old HP laptop just to see what it looked like inside.

"Alright, folks. Here we go!" I shouted.

I had fantasized about offering a play-by-play account of everything that was happening—including a final call as memorable as Al Michaels' famous "Do you believe in miracles? Yes!" Instead, I could only watch along with everyone else. Besides thumping, the H-PAS was also emitting a high-pitched whistling noise that made it impossible to shout over. As the piercing sound rose in intensity, so did the luminosity of the light clouds swirling on its surface. It was deafening, blinding—and more chaotic than controlled. I felt Amy's hand grab the cuff of my sleeve just as an incredible pulse of white light erupted from the center of the H-PAS.

"And *that*, my friends, is atomic sequencing through chemical electrolysis," I declared.

I removed the dark glasses from my face, which prompted everyone to do the same. I felt Amy's hand let go of me as she removed hers. The cramped classroom still smelled like someone had attempted to microwave a circuit board, but that didn't distract from what was revealed on the H-PAS. The scene was a perfect example of ironic juxtaposition. Sophisticated space-age equipment, on loan from both Google and NASA—and governed by the same mathematics that gave birth to the field of quantum mechanics—created something that looked almost primordial. The conical tops of seven or eight piles of elemental atoms

poked through a thin layer of cottony light, reminding me of the view outside my airplane window when flying into Seattle on cloudy days. But instead of pointing out Mt. Rainier, Mt. Baker, Mt. Adams, and Mount Olympus, I was staring at molehills of oxygen, carbon, hydrogen, and nitrogen.

"Amy, would you please type in capital C-O-M-P, backslash, followed by a lowercase *b* minus *c*?"

"We're weighing the atom piles, aren't we?" she asked as she began punching in the command.

"Yes, but it's more appropriate to say we're weighing *Mrs. G* again," I explained. "After all, those are still *her* atoms."

"It says zero again," she reported.

"Sounds like the atomic sequencing worked perfectly," I said as I walked toward the counter with the water bottles. I unzipped my backpack, thinking how much I despised stuffy briefcases, and pulled out the priceless moon rock that the fine folks of NASA had given me weeks earlier. I handed it to Amy, along with the framed proof of authenticity, and thanked her for her assistance. She gushed wildly as she practically skipped back to her desk, reminding me that she was, indeed, a 10-year-old. After noticing the lights were returned to full power, including the ones that were turned off when Mrs. G first entered the classroom, I gestured at Bruce, who understood we no longer had to look at a naked body. However, he, like everyone else, would soon learn that Rose Emily Ballard was *still* on top of the H-PAS.

"Isn't it compelling," I began, "that despite reorganizing Mrs. G's atoms into their respective element types, she still weighs exactly the same—right down to the very last atom? Again, you might be thinking, why does that even matter? Every

logical person knows that a car weighs the same whether it's assembled or disassembled, right? I hear you, but hang in there with me and you'll soon know why this is an important observation. I think a lot of us can imagine elemental atoms making up body parts like skin, arms, legs, hair, and teeth, but what about something as complex as a strand of DNA inside the nucleus of a human cell? Carbon atoms form the DNA backbone, nitrogen atoms form the four different genetic bases, and hydrogen atoms hold the double helix together. Like I said, *all* visible matter, including human beings, comes from one or more of the 118 elements on the periodic chart."

I moved away from the side camera and stood directly in front of the schoolchildren. From behind, I sensed the jerky movements of the cameraman with the handheld. "Please don't get too close to the H-PAS," I cautioned. "I haven't taken an inventory of her elements yet, so there might be some exposed lead or mercury." He backed away immediately, giving me a brief thrill from having told a believable white lie on live TV. I just wanted him out of the way.

"Okay, kids. I need you to lift up your desktops and see if there's a blue envelope inside. If so, I need you to come up here with the envelope and stand behind the H-PAS, facing the room. If you don't want to come up, give it to a classmate who does."

I love watching kids react to unexpected situations. Because they've yet to learn the socially mandated fine art of hiding their true selves, their unique personalities are revealed in moments they aren't prepared for. To some, everything is a game—a competition to determine the necessary pecking order. To others, it's a chance to nosedive into uncharted territory—an opportunity to meet the abyss head-on. And for a few, like me when I was a kid, it's a deer-in-the-headlights response until they've had enough time to assess the situation and rationally choose the right course of action.

When all six children were standing behind the H-PAS, holding their little blue envelopes like winning scratch-off tickets, I scanned the faces of the kids who remained at their desks. All, except for Amy, appeared dejected. She was looking down at the moon rock in her hand and smiling.

Sealed with a Kiss

A week earlier, I had met with Mrs. G's family and friends, asking them to compile six attributes that best describe their soon-to-be-deceased friend, mother, grandmother, and great-grandmother. I told them, "I want you to pare it down to just six words, with each word written on an index card and individually sealed in these blue envelopes. For example, if she was trustworthy, write that down and put it in the envelope." "What for?" asked Norma, Mrs. G's 71-year-old skeptical daughter, who had traveled from Spokane, Washington, for the event. "Don't worry," I reassured her. "These cards are not only a crucial part of the presentation, but they will also serve to honor your mother."

"Before we get to the envelopes," I said to the classroom audience, "I need to prepare the H-PAS first. You're really going to appreciate this next feature."

After typing the command in Willow, I stood beside the excited children and watched while the layer of frosty mist retreated from the tabletop, revealing many piles of elemental atoms nowhere near as tall as the "big four."

"Hey, Carlos," I whispered. "Would you mind helping me out?"

"Do I have to say anything?" he whispered back.

"No, not at all. You just have to press a glowing orange button when it pops up on the small screen in front of you."

When a look of bewilderment emerged on his face, I leaned over and pointed at the seldom-used interface, which was cleverly built into the top rail of the H-PAS. “It’s easy to miss,” I whispered.

No sooner had Carlos removed his finger than the names of the elements present on the tabletop materialized above their respective atom piles in colorful holographic letters. I had to shake my head at the audible gasps heard around the room, prompting me to sarcastically say, “Yeah, it’s pretty cool to see a hovering purple phosphorus, a yellow sulfur, and an orange copper, but those are just *words* in 3-D laser light—you just witnessed a first-ever live atom sequencing event, folks!”

“Another cool thing to point out,” I continued, “is that the H-PAS is able to defy a few pesky natural laws of the kinetic energy of matter. Some of the elements you see here are only stable in gas or liquid form; yet, here on the H-PAS, Mrs. G’s atoms are presented unilaterally as piles of powdery solids. If this were not the case, we’d all be toasted by the intense heat generated from out-of-control chemical chain reactions. But don’t worry. The production staff will be handing out lead aprons for everyone. If they’re too heavy to lift, just ask your neighbor to help you drape it over your chest and midsection.”

I paused a few seconds, allowing the leg-pulling to marinate for maximum effect, catching my director’s eyes in the process. Bruce was smiling and shaking his head, playfully feigning either his disapproval or weariness of my incessant joke-telling. Feeling emboldened, I doubled down and pointed out that Mrs. G not only had some silver atoms in her, but she also had a little gold, too. “In fact, we all do,” I said, while looking directly at the seated 10-year-old future pawn shop owner. “We absorb trace amounts of these precious metals from what we eat, drink, and breathe before storing them in our skin, bones, liver, kidney, spleen, lungs, and brain. Did you get all that, Jeffrey?”

I came out from behind the H-PAS to retrieve my bottle of water from the stool. After taking two big swigs, I explained that I was kidding about the lead aprons, but my remarks about Mrs. G's gold and silver atoms weren't jokes.

"Now let's continue down the homestretch and get to the conclusion of this initial part of today's presentation, shall we?" I placed the water bottle back on the stool and returned to the H-PAS, positioning myself in the middle of the half-dozen schoolchildren. "Inside each of the envelopes, you'll find a description of Mrs. G. I have no idea what's written on the index cards," I lied, "but all you have to do is read it out loud and then point to it on the H-PAS. For example, it might say 'knobby knees,' 'hard bones,' or 'pale blue eyes.'"

Alex, whose parents most likely wrestled him into his corduroy sport coat, spoke up from the other side of Carlos. He looked like a miniature college professor. All that was missing was the suede patches on the elbows and a pocket protector. "But wouldn't it be easier if Mrs. G wasn't reorganized into 58 piles of elemental atoms?" he asked.

Wow, this little guy really is a professor! "Excellent observation, Alex," I replied. "You're right. But give it your best shot. If I were you, I'd just point to oxygen or carbon if I didn't know the answer. Those two atoms are practically everywhere in the human body, right? But if you happen to know that bones contain phosphorus and calcium, go for it."

Soon after the kids began pulling the index cards out of the envelopes, their expressions went from anticipatory eagerness to stilted confusion. So far, my plan was working perfectly. I watched one little girl sharing what was written on her card with the classmates on either side of her. "What's wrong, Sasha?" I asked. The freckled-face redhead turned toward me and—through her expression alone—looked as if she was speaking for the other five. "Mine doesn't have a body part written on it, and I don't think the other cards do either," she said.

“Really? What does yours say?” I asked, doing my best to look as befuddled as her and her classmates.

“It says, ‘funny.’”

“Hmm. Okay. Well, can you point to it on the H-PAS anyway?”

“Point to what?” she asked.

“It sounds like Mrs. G had a terrific sense of humor,” I explained. “Isn’t that a part of who she was, Sasha? You’re not just a skull, a face, skin, bones, hands, feet, organs, and ginger hair, are you?” Sasha slowly shook her head and looked toward who I presumed were her parents. “Of course, you’re not, and neither was Mrs. G. Let’s see what’s written on the other cards, okay?”

“Okay,” she said, “but I still don’t know where to point.”

“Let’s hold off on that for right now,” I replied.

Over the next few minutes, I had similar exchanges with the other children whose cards said ‘compassionate,’ ‘nurturing,’ ‘dependable,’ ‘honest,’ and ‘generous.’ Their inability to point out these six attributes of Mrs. G prompted me to ask them a rhetorical question: “If they’re not on the H-PAS, then where are they?”

And then it happened. One of the seated kids blurted out an answer without being called upon—a big no-no that the children were warned about doing. But I was far from annoyed. It was unscripted perfection that only a child could pull off—one that would open the door and pave the way to my conclusionary statements.

Amy had shouted, “They’re in heaven—like my grandpa!”

Mind-Body Separation

After ushering the children back to their desks and promising that they and their classmates will be receiving a Kindle Paperwhite, including a 5-year reading subscription to Amazon Kids+, I turned my attention to Amy, who was making me wonder if the moon rock was less of a gift and more like a savvy investment on my part. “How can your grandpa be buried in a cemetery *and* be in heaven at the same time?” I asked.

While shuffling the moon rock back and forth between her hands, she replied, “His *soul* is in heaven.”

“Okay. But what’s a soul?” I pushed.

“It’s the ‘inside person,’” she clarified.

“So, you’re telling me that when you die, your inside person goes to heaven, right?”

“Yes.”

“Do you think people who are still living have souls, too?”

“Of course. Everyone has a soul.”

“I agree with you, Amy, but not everyone refers to their inside person as a soul. Some call it their spirit; others call it their true self. My best friend refers to her inside person as her inner voice. Personally, I go back and forth, calling it either consciousness or the mind. But they all basically mean the same thing. It’s like we’re all driving around by ourselves in our own little car with tinted windows. Nobody can see the driver behind the wheel. Nobody knows what the driver is

thinking or feeling or what they'll do next. All they can see is the outside of the car. Would you agree that a car is like a person's body and the hidden driver is the inside person?" I asked.

"Yes," she replied.

"Then your way of thinking is in alignment with iconic philosophers like Plato, Aristotle, and René Descartes, all of whom rationalized the separateness of mind and body. So, in a way, Amy, with your understanding of the inside person, you're like a modern-day philosopher? Isn't that cool?"

Right away, I knew I had made a mistake. She tucked her arms against her chest and dropped her gaze to the moon rock clasped in her hands. I either embarrassed her or insulted her intelligence, most likely the latter. Of course she knew she wasn't a philosopher. She simply felt comfort in believing her grandpa's soul was in heaven. Rather than backtrack to save face, I chalked it up as a lesson learned and pushed forward.

"Isn't it ironic," I continued, looking into the fisheye of the center camera, "that it's the 'inside person' who we feel most when we interact with others, and yet, as the H-PAS clearly demonstrated, this invisible entity hasn't any mass or weight?" I stepped toward the H-PAS, and while gesturing toward the 58 piles of elemental atoms, I said, "Here lies the late Rose Emily McGillicuddy—all 98 pounds of her—the same weight and number of atoms she had when she was first wheeled into this room not more than 20 minutes ago. Even after passing away and having her atoms reorganized, these parameters remain unchanged. Whether we're observing Mrs. G as a lifeless body or piles of elemental atoms, we cannot detect the hidden driver. No matter how many different ways we arrange and rearrange Mrs. G's physical composition, we can only measure what's left of the inoperable car that up until today carried her through life for 93 years."

I walked toward Google's gem of a computer and stood in front of the control panel. I paused for a moment, nodding at Bruce to let him know I was about to launch into the presentation's second part. My fingers tapped along the keyboard, finishing in dramatic flair as I pressed ENTER. I returned to the front of the room and scanned the faces to see if I had lost anyone along the way. They were riveted and sitting on the edge of their seats—and, of course, I knew why.

"Even before today's demonstration, I believe it's fair to say that the vast majority of people, whether they're spiritual or not, agree with the philosophical notion of mind-body separateness. Mrs. G's family and friends will be the first to tell you that her hidden driver, inside person, soul, spirit, inner voice, mind, consciousness, or whatever you want to call it was felt by them during their emotional visitation with her this morning. We're going to talk a lot more about the mind in the third part of today's lecture, but the second part is wholly dedicated to understanding the body like the one you see on the H-PAS right now, which is, for the most part, no different than all the human bodies that ever existed—including the bodies of living people like you and me."

Suddenly, as if on cue, Willow began repeating a pattern of three chirps followed by a deep rumble, exciting Carlos enough to make him raise his hand and causing me to conclude that his shyness must come and go.

"Yes, Carlos. What is it?"

"Are you going to turn Mrs. G back into her body?" he asked.

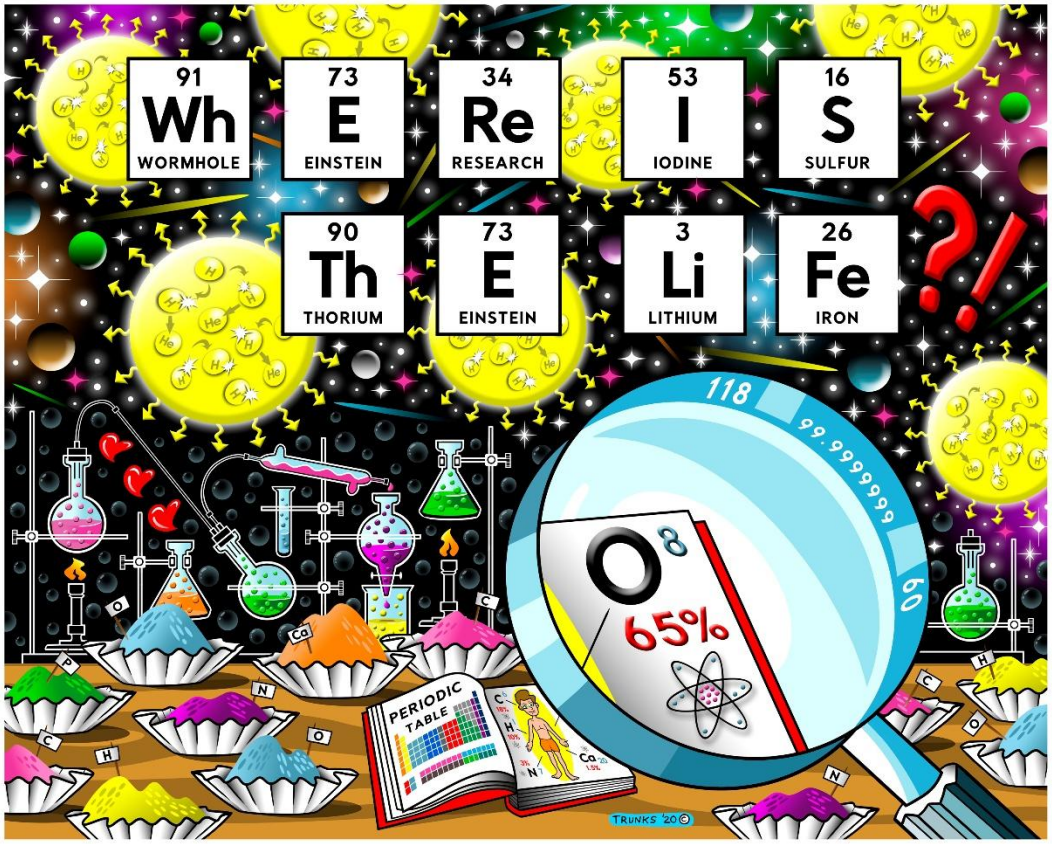
"No, Carlos. That's not possible."

"Why not? She's dead already," he reasoned.

“It’s more complicated than that,” I replied. “You’re right. She’s dead, but her body isn’t. Not by a long shot.”

The End (of Chapter 1)

Where is the Life? by Chuck Trunks (2020)



I created *Where is the Life?* in 2020 as part of a 12-piece series of graphic art relating to physics. Although this particular composition required over 100 hours to create, I’ve been thinking about writing this story for nearly 10 years. (www.trunksart.com/physics-series)