CHAPTER 1: INTRODUCTION

My Journey to Neuroscience

Your best choice and your worst choice are rarely separated by values and skills, and almost entirely by the crowd noise in your brain over those choices.

This is my tenth book. I have been exploring the human experience, both formally and informally, for as far back as my memories go. As the sixth of seven children in a small home in Africa, the dynamics of my household created the perfect petri dish to explore different personalities, genders, and cultural biases inherent in a South Asian family living in Africa as immigrants. My narratives of the experiences around me were dampened by older siblings and an abusive father, but amplified by the love of a mother who always provided a safe refuge in her smile, arms, and humor. I write books because I have struggled to make sense of this thing we are doing that we call "living." I am less burdened with the age-old questions of "why are we here?" and "what is our purpose?" and more intrigued with "how can I be the best version of myself?" while I am here, especially when I need to be. No matter the dozens of belief systems answering those questions, I still find my "happiness" tied to when I can somehow say or do the right thing at the right moment. It's "magic" when my brain thinks and does the right thing. The shelf life of those moments of "being my best" seems to parlay into that thing we call "confidence." Conversely, I feel troubled when I fail to do that. The mystery of not doing what I am fully capable of doing in moments that matter is profoundly disabling and has a very long shelf life! I find my happiness tied less to what I possess, and more to what I can do in moments that matter. What does it matter if I am wearing a $10K watch if I can't do the right thing at the right moment? I make these confessions acknowledging not knowing until recently how to even define "happiness" beyond the archaic labels of joy, and a sense of peace. Any suffering I felt seemed to be tied less to circumstance and possessions, and more to lack of ideas or feeling hopelessness. It appears to me that possessions are a wonderful disguise for the inherent confusion of the lived experiences we have. The human experience, all of it, increasingly seemed to lead me to a very small place – my brain.

I'm now coming on six decades of living, and happy to report that I have settled on some good answers. It took a while, and admittedly, the journey continues, but I have explored almost all the frameworks Man has explored from Religion to Spirituality to Science to Lifestyles, old and new. I have had countless conversations with fellow humans from a vast diversity of backgrounds – a few heated ones, but mostly very collaborative and healthy. For me, every perspective seemed to have just enough flaws of some kind to make me question it. Truthfully, I

wish this were not the case. I wish I could just suspend critical thinking and logic and just believe. There is merit to Pascal's Wager, the 17th Century Mathematician and Philosopher, who used probability to argue that there's nothing to lose by believing and a lot to gain, so why not believe? Why not? Oof! First, I tried, and I found myself more troubled knowing I was embracing a framework that I knew was flawed. Second, they did not work for me in those moments that mattered. Lastly, the tribal nature of each framework made it easier to find a community, but also inherently alienated me from others. I struggled with any framework suggesting it is right and the rest are wrong. I struggled with the right framework borne more out of circumstance (where/when you were born, what your parents believed in, etc.) than personal exploration and logic.

The search continued until I stumbled upon neuroscience. This took me to that small place where everything seemed to be happening – the brain.

My academic background has comprised an unintended and somewhat circuitous journey into neuroscience over the past decade.

My initial college degree was a Bachelor of Science in Physics from Davidson College. The study of matter, forces, and electricity was at the core of understanding much of how things worked. What made something move or break? How did electricity travel from a source to a device to get it to function? I then went to acquire another Bachelor of Science in Civil Engineering from North Carolina State University. A deeper understanding of structure, pressure, and forces led to understanding how to design bridges, roads, and systems carrying water. A great deal of an understanding of nature (topography, weather, etc.) and its forces was leveraged into my way of thinking and making sense of life. I began to understand the "infrastructure" of human movement and its dependencies on nature. I understood how things around us worked, but still not how humans worked! I believed that if the movement of objects could be explained, and the infrastructure of a functioning society could be explained and optimized, then perhaps the human being could also be explained using similar frameworks. It was just an aspiration … an aspiration of a "searching soul" to make sense of all that was inside my little brain.

My fascination shifted from a deep understanding of matter and nature to a deep understanding of the human experience, specifically human performance. In physics, when I built a circuit board, I knew whether it worked or not because a light bulb would either light up or not. In engineering, I knew what it took to design the curvature of a road for cars traveling at a certain speed – and we knew whether it was right or wrong based on countless tests that created a design template. We know when using these frameworks whether we got it right or wrong. What kind of framework or model or archetype similarly would allow me to know if a framework for the human experience worked or not?

When I got my MBA, I studied organizations and the people in them. It seemed clear that if the organization as a whole performed well, whatever the metrics of performance were, that somehow performance—doing your best when it matters—seemed to be the "key clue" to whether we got the "human experience" right. What I then found infinitely more fascinating than electric boards and highway systems, was what it took to get people to perform at a high level. What systems and "structures" would need to be in place in a company to make all the people run smoothly? I pivoted and got a Doctorate in Management, all the while working in consulting firms on projects and in companies around the world, coaching clients and implementing high performance systems to support collaborative cultures for high performance. Even though I was good at this, something was missing from all the knowledge I had learned and experienced. I did not know what it was except that at the center of everything seemed to be a very small place that all those people in the organization had and used non-stop – the brain.

In the early 1990s, I was exposed to the seminal work by Peter Salovey and John Mayer in their article "Emotional Intelligence" (EQ), published in the journal, *Imagination, Cognition, and Personality*, where I found a new framework. For the first time, similar to the way I studied physics, engineering and business, I was exposed to what was "under the hood" of the human experience. Having observed the workplace for over 30 years, I noticed that regardless of an individual's skills, if their emotional temperature was high, their skills eroded quickly, and performance suffered. I went on to author and co-author three books leveraging this framework: *Triathlete EQ, Golf EQ*, and *Healthcare EQ*. I was happy to find fewer flaws in this framework, but something was still missing. I thought I had it all figured and demystified the human rubric for performance until I asked the questions: Where do thoughts and emotions come from? How are they created? Is there a way to go upstream of the human experience—where it all starts—and address things there so downstream work is easier?

These questions peaked around 2015, and in 2016—about a decade after earning my doctorate—I made yet another pivot … into neuroscience. Because I already had my doctorate, for the first time I felt free to study a body of knowledge with freedom to go anywhere, to anyone, from any source, and learn it not for a grade on a paper or certificate, but purely to understand it. The timing was perfect as technology of all kinds allowed me to access not just past and current knowledge, but to collaborate with people to get bits and pieces of the puzzle from whatever corner of the world they were. It was shockingly easy to use WhatsApp to message anyone anywhere and in real-time have the kind of priceless collaborative exchanges that just a few years ago would have taken months to organize, would be filled with uncertainty, and costly, too. I created my own body of knowledge motivated only by my desire to understand the noise in our brain – where I knew all the action was of this human experience. My hypothesis of whether a framework worked or not was simple: **Did it lead to you being the best version of yourself when it mattered most?**

I want to make clear that being the best version of yourself includes moments outside your professional craft, perhaps more importantly.. They could be moments with your child wanting

to say or do just the right thing to put a smile on their face or give them a perspective that leads them to a better understanding of a troubling situation. They could be wanting to laugh during dinner with friends by being present and enjoying their company. They could be wanting to appreciate great artwork in the performance of an artist or athlete. They could be being by yourself in a state of flow, doing whatever you want without the heavy burden of the non-stop chatter in your brain.

This is what led to studying the upstream elements of the human experience, including performing under stress.

This is what led to neuroscience.

The analogy I want you to have as you read this book is to imagine that you have a beautiful cabin by a small river in the mountains. Every morning, you wake up and go out to your deck overlooking the river with your beverage of choice and enjoy the spectacular sunrise and sounds of water flowing. However, each morning, a bag of trash from somewhere upstream comes down river and gets stuck right in front of your cabin. No problem. You go down there, pick up the bag and put it in your trash can. Problem solved. You then enjoy the rest of your day. There was a daily problem in your experience, and you solved it. But isn't the better solution to go upstream, see where the bag of trash is coming from and stop it there? Sure, I think most of you would agree.

The human brain is that upstream source where everything comes from. Our feelings, thoughts, behaviors, and desired actions are all being manufactured in the brain and showing up to our awareness (conscious) only when they are downstream.

I suddenly found myself disappointed and almost angry that I had spent so much of my time, formally and experientially, trying to decode human performance and no one had ever guided me to study the brain's role. So much of my work was addressing and fixing downstream issues. So, you can imagine my surprise when, during her lecture, Neuroscience Professor Dr. Bing Brunton from the University of Washington uttered the words that would profoundly impact my exploration: "Electricity is the Language of the Brain."

Wait, what? Electricity? The same electricity that I studied in the 1980s at Davidson College? Electricity is the language of motor pattern and sequence to generate the desired neuromuscular vector (direction and magnitude) forces. Wait, what? The same vector forces I learned and applied from physics and engineering? Electricity is used for one neuron to communicate to another carrying action potentials – the eventual outcome of thoughts, feelings, behavior – including desired motor function (like making a decision). Electricity.

But why electricity? Why not gravity, light, or a form of internal pressure system like the cardiovascular system? Why must the language of the brain (and thereby memory and motor function) be electricity? Well, the answer is a lot simpler than the question.

If there's a bug that stings you behind your right shoulder, you need to know this immediately. Information about the nature of the sting needs to travel super-fast from that specific spot behind your shoulder to your brain and be processed as a threat. Memories have to be accessed quickly to give it a threat assessment. Any delay in this transmission of information could lead to the bug continuing to sting you. Within milliseconds, this relay is accomplished, and your left hand and arm quickly, without any conscious thought, reach to the exact geospatial location of the bug bite and slap it away. This speed is necessary for this level of self-preservation, and only electricity can facilitate this kind of absolutely stunning speed of diagnostics and self-defensive protective motor movement. There is that term "movement" again that I studied in physics and engineering.

In addition to speed, imagine the lived human experience without movement. We all must move our heads to see something, use our arms and hands to grab something and feed ourselves, use our legs and feet for balance and walking or running to get food or run away from danger. This movement requires muscles to work together in some sequence and at some required level of force and speed. The language of motor movement has to be electricity—it could not possibly be anything else based on what we know. The collaboration between the brain and subsequent movement, of body and thoughts, is a key piece of that puzzle. The "supply chain" of thoughts seemed to be an ever-increasing consumption of stimulation for the brain, but entirely enabled by electricity.

Wait again. So, in physics and engineering, we could measure everything. I knew we could measure electricity and forces, but could we measure electricity in the brain? Yes!! And we have been doing it successfully since about the 1920s. That is only about 100 years. I began to explore technologies to measure electricity, and I found that most measurements were being done in either hospitals or research centers. Almost all were in the clinical setting. That means most of our research and knowledge of the brain is based on clinical conditions—where something is very wrong. This makes sense. It makes sense to study Alzheimer's, Dementia, Parkinsons, Schizophrenia, Huntington's Disease, TBI, and such. *According to the American Brain Foundation, in 2021, approximately 3.4 billion people in the world (about 43% of the global population) are living with a neurological condition, making it the largest cause of ill-health worldwide*. Studying these clinical conditions means we can find cures for them. The brain is incredibly complex, and understanding neurobiology, neurochemistry, neuroanatomy, and neuro-electricity are all required for these clinical conditions. This understanding has led to the development of drugs and therapies that help many people suffering from these awful diseases.

My own mother died in 2022 from Alzheimer's. This is a type of disease that, in my view, is the worst of all. Who are we without any memory? Where did all her memories go, and why could Mom not recognize me, her own son? What was happening in her brain? Trying to understand this in the ten or so years prior to her death pushed me with relentless motivation to study neuroscience not just from a human performance perspective, but also from a deeply personal one.

I am not qualified to study these clinical conditions or cures, nor did I have the resources to do so. I leave that for people far smarter than me. But I wanted to carve out a piece of this puzzle that perhaps clinical research was not inclined to address. So, I put everything into this new career pivot and focused on studying what I could. Human Performance, being our best when it matters the most, is not a neurological disorder – it is a daily human experience. This I could study! Since 2003, I had started to work with professional athletes and teams – where performance could be measured tangibly. You won or lost a game. You scored a certain number. Every sport has its own set of performance metrics, and they seemed to be growing I might add. Unlike most other life experiences, the microcosm of an athletic event, being short, minutes to hours, meant I could study desired outcomes quickly. In contrast, non-athletic events, like having a great dinner with your friends, are hard to quantify objectively.

There was one more personal motivation. My son was in high school, in the Class of 2024, and a junior golfer with aspirations to play golf in college. From about 2014 to 2024, I took him to countless junior golf tournaments. We went through all the ups and downs that are relatable for any parent of a junior athlete. My son was aware of what I did for a living, working with professional athletes who would fly in and stay at our home. Even though I had perhaps a little higher "street cred" because of my work, I was still his dad, and he was still my son. I could not teach him what I was teaching professional athletes/coaches, neither in style nor content. With children, the timing of the lesson is critical, not just the lesson. I forced myself to learn as much as I could about the neuroscience of performance because that gave me a much bigger basket of ideas to then pull from to coach him both as a child and as *my* child. I had to speak his language, which often meant being more creative and situational, as opposed to logical and formal.

And so, my intense motivation to study the brain was driven by a combination of my life in Africa, my childhood family dynamics, my job, the pain of my mom's condition, and raising a junior athlete. Enabled by the freedom that comes from not needing another degree (I already had two undergrads, a master's, and a doctorate) and reaching an age where I detached my value from my possessions to my ideas and ability to help others, I marched on with peaceful excitement.

I was interested in knowing what is happening in a normal brain (not clinical) for far simpler, measurable cognitive and neuromuscular performance goals. I wanted to know: what is the state of the brain when one is calm and focused and performing at a high level versus agitated and angry and performing poorly? Is the brain different in these two performance states? I was already working with coaches/athletes in all sports, but leveraging EQ frameworks, not neuroscience. I was not looking at the electricity in their brains. I did not know I could even do that—time to pivot.

There are many ways and types of equipment used to measure brain activity. The most common one is Magnetic Resonance Imaging (MRI), which uses a magnetic field and radio waves. This is possibly the most accurate way, but the equipment used is a massive machine requiring

individuals to lie horizontally and very still. This is great for clinical purposes, but not for daily activities where we want to be the best version of ourselves when it really matters!

Another turn of events that coincided conveniently with everything happening in my life was the invention of portable and wireless EEG devices. An EEG (electroencephalogram) measures electrical activity in the brain, and we have been able to do this for approximately 100 years. It is typically measured in Hertz (Hz) or microvolts (UV), which is the amplitude of the Hz. Magic happened around 2015. The new magic was not in the measurement itself but in the wireless measurement. I was now able to stand 6-12 feet away from any person trying to perform any task, cognitive or neuromuscular, or both, and look in real time into their brains. I had no idea that, as of this writing, I would have done over 18,000 of these scans and counting.

A sample of the non-clinical scans I have conducted includes investigations of brains performing tasks such as:

- Shooting a free throw in basketball
- Making all kinds of life choices
- A baseball player throwing a pitch
- A baseball batter on deck and at bat
- A quarterback throwing a football
- My son trying to make a golf putt
- Non-target sports athletes like NASCAR, swimmers, runners, cyclists, etc.
- An executive thinking through a business decision
- An artist trying to be creative
- A youth diagnosed with ADD trying to focus on a school quiz or sport

… and my mom trying to recall a memory!

Looking exclusively at electricity initially (later technologies incorporated heart rate and brain oxygen levels), I began to see predictable patterns, which are discussed in detail in Chapter 3. Essentially, every higher human ability (cognitive and neuromuscular) seems to occur in lower frequencies (10-20Hz). This was not ground-breaking as it was already established in the neuroscience world, but I was seeing it myself firsthand. This baseline data set in motion the most important question: *is it possible to get to this high-performing state on command, anywhere, anytime, and especially in the critical moments where traditional approaches are impractical?* If a basketball performer is on the free throw line with one second to go and the game on the line, he cannot call a timeout and go meditate for 30 minutes, return in that calm state, and make the play. A golfer does not have time when over a seemingly makeable decision, his brain is yelling at himself internally. If you're taking a quiz/exam and suddenly cannot recall what you studied/know, is it possible to shift the brain to 10Hz? If you're about to go on stage to speak or present to customers and feel like everything in your body is shaking, what can you do? If you're having a heated conversation with a loved one, and you're both saying/behaving in

ways you know you will regret, what can be done in split seconds? What options are available in these all-too-common high-performance scenarios? Is it not in these moments, as the cliché goes, that champions are made? Is it not in these moments that if we recall what we know, calm ourselves down, say/act in ways that are our best, that we are given the ultimate satisfaction and confidence? The sports world is full of cliches describing these situations when we cannot be our best: choking, managing nerves, under-the-gun, crunch time, digging deep, and moment-of-truth. These Bronze Age terms describe elevated levels of electricity both in the brain and traveling from the brain to neuromuscular functions. In moments when time-outs are not available, new skills are required that only take seconds. These are neurohacks and discussed in Chapter 4.

The answer to the critical question (is it possible to get to this high-performing state on command, anywhere, anytime, and especially in-the-game moments?) is yes. The methodology and tools to do so are discussed in detail with examples and case studies in this book. This is that Upstream Fix that was mentioned earlier.

It is worth noting that we may have been thinking about our Happiness and High Performance incorrectly to begin with. Regarding life specifically, a good question to ask is, "How long do I need to be happy or in a high-performing state?" Is it really 24/7? Or eight hours of work or a school day? Or is it ONLY when the moment requires it? Do you need to be perfect when commuting to work or school? Or do you need to be perfect when the quiz starts or when you're about to go on stage? And what if we are only perfect, our best selves, only in those key moments in each day? Is that enough? Is that happiness? Is this not a far more reasonable ask of self? *Like in key moments in sports, the game of life does not always make available a time-out where traditional approaches can be used to "collect yourself" and then return to the critical moment.*

One of the people I have an enormous amount of respect for is Dr. Robert Sapolsky at Stanford University, the winner of numerous awards for bridging many sciences together like neuroscience, primatology, neuroendocrinology, and behavioral sciences. He has spent decades studying baboons in Kenya. Similarly, Jane Goodall studied chimpanzees in Tanzania, Dian Fosse studied gorillas in Rwanda, David Mech studied mountain wolves in US/Canada, Karl Von Frich studied honeybees, Denise Herzing studied dolphins, and so on. The study of a type of population or society can give clues to decoding their lived experiences. *I studied athletes in over 18,000 instances trying to be the best version of themselves. I looked in their brains before, during, and after that moment when they needed to be their best.*

Turns out, several of the pioneers of neuroscience (see Table 1) actually had backgrounds in physics. There is a wonderful sibling framework between how things work in life (electricity, force, motion) and how things work in the brain. I did not know this, but once I did, I gained confidence that I could blend these families of science into exploring neuroscience.

Here's the table of **pioneers in neuroscience with a physics background**, showing their original physics focus, neuroscience contributions, and where they studied:

Table 1. Pioneers in Neuroscience

Pioneer	Physics Specialty / Training	Key Neuroscience Contribution	College / University Attended
Francis Crick (1916–2004, UK)	Physics; radar research during WWII	Theories of consciousness, vision; co-discoverer of DNA structure; neural coding	University College London (Physics)
Ernst Mach (1838–1916, Austria)	Experimental physics, mechanics	Sensory perception studies, vestibular system research; psychophysics foundations	University of Vienna
John Hopfield (1933–2022, USA)	Theoretical physics, condensed matter	Hopfield neural networks; computational neuroscience modeling	Swarthmore College (BA Physics), Cornell University (PhD Physics)
Walter Pitts (1923–1969, USA)	Self-taught physics and mathematics	Co-creator of McCulloch–Pitts neuron model; foundation of computational neuroscience	University of Chicago (attended, no degree)
Karl Friston (b. 1959, UK)	Karl Friston (b. 1959, UK) Theoretical physics before medicine	Free Energy Principle; statistical parametric mapping for brain imaging	University of Cambridge (Natural Sciences, Physics), King's College London (Medicine)
David Marr (1945–1980, UK)	Mathematics & theoretical physics	Computational theories of vision, memory, and brain function	Trinity College, Cambridge University
Max Delbrück (1906–1981, Germany/USA)	Quantum physics, theoretical physics	Molecular biology pioneer; genetics models influencing neuroscience	University of Göttingen (Physics), University of Bristol, University of Zurich
Christof Koch (b. 1956, USA/Germany)	Physics & philosophy of science	Neural correlates of consciousness; visual attention mechanisms	University of Tübingen (Physics, PhD)

In this book, I want to share what I have discovered about that little space where everything seems to be happening – the brain. I do not have answers to "why are we here?" or "what is our purpose?" or "what happens to us after we die?" but I am offering the answer to the question "how can I be the best version of myself especially when I need to?" I am arguing that the more times we are the best versions of ourselves in those moments that matter, then the healthier our brains are. These healthier brains, by accumulating daily high experiences, will lead you to your own answers to those other questions. I want to offer you a different model of wellness and happiness – a more reasonable one: *To identify key moments in each day that you need to get your brain to 10Hz and use simple self-care tools to do so.*

Also in this book, I give you simple language and tools to understand electricity in your brain. The language and tools are not just for key moments of being our best versions, but also to help those you love and who you rely on for your happiness.

There were many accidental discoveries made when doing the 18,000+ EEG scans. I have captured them in each chapter. Looking at a live brain before, during, and after a moment that it wants to be its best reveals not just answers, but more questions to explore. I truly felt like the questions that unraveled were more compelling than the answers I seemed to have found. The questions led to better scenarios for me to study and feel more confident in the conclusions I drew.

Because I am now aware that upstream is where the magic is—the brain—it was incumbent on me, not you, to write this book in such a manner that your brain can absorb the knowledge. Even though this is my tenth book, I wrote this book very differently from all my previous ones. Chapters are sequenced with simple frameworks that can be applied to any human being, irrespective of age, gender, culture, or challenge at hand. I give examples both from my own research and from numerous sources from the collective human experience. Chapters end with "key takeaways" so that the points in the chapter can be stored more effectively, making them less likely to forget, and more likely to recall when you need them most! I end the book with random thoughts that appeared in my head watching humans try to be their best – a closing potpourri of simple thoughts for you.

I am in the twilight of my life now. My future is certainly shorter than my past. Please know I wrote this book with the intention of adding to the body of knowledge regarding this amazing gift of life. I hope a few of you will take up neuroscience and continue to research the brain, for it is the most fascinating phenomenon in the universe. I hope research proves some of my claims correct, some incorrect, but all well-intentioned to help us enrich our life experience. I have realized that the human experience is entirely processed in a 3.5-pound organ—the brain—caged in a skull that we know very little about. If you know how to use your phone better than how to use your brain, you're leaving a great deal on the table. The time has come to understand your brain, as the journey of life is really all between you and yourself.

The human brain does not do "random" – the reason for a thought, feeling, or behavior may not be clear but there IS a reason!