Beginning Quantum Field Theory

Option 1: Faithful English Translation

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Why quantum field theory?

There are far too many people who are suffering.

This has been the lifelong question that has stayed with me. Can't everyone live a little more peacefully and well? Why are there so many people who are suffering?

When I stepped down in 2014 from my position as the executive in charge of CPU development after ten years at Samsung Electronics, I suffered greatly. Above all, my heart suffered deeply.

It was clear to me that the world was moving toward GPUs built on a new CPU-like architecture, yet Samsung was not prepared at all for the future of CPU/GPU technology.

Over the course of about two years, I prepared a next-generation CPU/GPU development strategy for where Samsung should be headed ten years later, together with Dan Dobberpuhl—the former head of PA Semi, whom Steve Jobs praised as the best CPU designer in the world—Professor Anantha Chandrakasan, Dean of MIT and a world-renowned scholar in semiconductor circuit design, Professor Dimitri Antoniadis, a world-renowned MIT scholar in semiconductor devices, and Le Nguyen, a brilliant DEC-trained CPU architect.

First, rather than following the existing NVIDIA GPU structure, which was extremely difficult to program, I proposed preemptively developing a CPU-style GPU—one that could be programmed as freely as a CPU. This was the kind of revolutionary GPU that Steve Jobs had wanted, as Dan Dobberpuhl personally told me after joining Apple. The goal was to overcome the most serious problem inside NVIDIA GPUs: the memory bottleneck between processors, by building a CPU-type GPU based on Massively Volumetric Reconfigurable Memory.

Second, Samsung would have no real market competitiveness by merely imitating existing NVIDIA GPUs. But if it responded ahead of time during the major market transition—from conventional GPU structures to a completely new CPU-type GPU architecture—it would have a strong chance of winning.

Third, and above all, to radically raise the stalled CPU clock speed from the 2–3 GHz range to the 200–300 GHz range, I proposed preemptively developing a transistor technology that would completely surpass Intel's FinFET—by focusing not on conventional 1 V-class devices, but on ultra-high-speed, ultra-low-power 100 mV-class transistors built on the MBC FET (Multi Bridge Channel FET) structure, which Samsung had first developed in the industry in 2004.

With these three strategies, I established a next-generation CPU/GPU super-gap leadership strategy aimed at future smartphones from Apple and Samsung; however,

when Steve Jobs—who had carried the dream of an innovative GPU—passed away in 2011, the vision for such an innovative GPU disappeared inside Apple as well,

I left Samsung, and by 2023 the world had become one dominated by NVIDIA GPUs—hardware that, in my view, is almost crude in structure, extremely difficult to program, yet with no real alternative. And only belatedly did Samsung begin focusing on MBC FET, now hurriedly trying to build a differentiated strategy.

From my standpoint—as someone who had consistently advocated since 2010 for preemptive GPU development and for a super-gap MBC FET program—you can imagine how much my heart burned with frustration, anguish, and pain ...

In January 2014, after the opinions of some of the world's greatest experts were not accepted and I instead had to leave the company, I went with my wife to Cheonjangam in Seosan ("the hermitage hidden by heaven") to extinguish the fire of anger in my heart—a heart that had become an entire sea of flames from a single fiery arrow drawn by rage.

> "Yeomgungmun" (Gate of the Drawn Mind-Bow): the gate where the arrow of the heart is pulled to its limit, the gate that reaches the farthest end of thought.

I went there hoping that by seeing the powerful calligraphy of the legendary Zen master Gyeongheo ("Empty Mirror"), who helped revive modern Korean Buddhism, I might be able to calm at least some of the fire of anger in my heart.

After looking around the temple several times and failing to find it, just as we were about to leave, a lady standing in front of a two-story building was waving her hand.

Thinking she might be calling us, we went closer. She was a kind-looking woman, around sixty years old, and she said yes, she had indeed called us—the head monk had told her that if any guests passed by, she must absolutely invite them in for a cup of tea.

I had often wondered what kind of people lived in such a place, so I thought this was a fortunate opportunity, and we followed her into the room.

In the middle of the warm room was a tea table, and as she brewed us tea, we began talking about one thing and another.

Even though we had just met her for the first time, she shared her story with a sincerity that felt as if we had known each other for a long time.

To my surprise, she told us that she had been discharged from a psychiatric hospital just one month earlier. Ah! My goodness!!!

It was a situation I had never encountered in my life. My wife and I found ourselves more and more drawn into the story of this warm, dignified woman—someone who must have been strikingly beautiful in her younger years—and what kind of life story she could possibly have carried.

She had a son. From the age of seven, he had schizophrenia. He said he heard voices from under the bed and from outside the window.

There was nothing she had not tried. She held shamanic rituals, went to countless hospitals, and attended church to pray.

But that winter, only one week after she began a 100-day prayer vigil for her son, on a bitterly cold winter day, her son took off all his clothes and jumped from the rooftop of their apartment building.

His red blood on that white snow . . .

And yet, even then, she did not lose her mind.

She had run a small snack shop in Bucheon, but after their son's death, her husband seemed half out of his mind—bringing other women into the house and behaving as if he had completely lost himself.

Then a church pastor, claiming he wanted to comfort her, attempted to sexually assault her,

and in the end, a church elder ran off with the 20 million won deposit from her snack shop.

Only after all that did she finally lose her mental balance. After barely being discharged from the psychiatric hospital, she had nowhere to go. By a turn of fate, she met the head monk of Cheonjangam, and that is how she came to live there, cooking meals for the temple as a kitchen helper.

As I listened—utterly stunned—and as a churchgoing person myself, becoming deeply furious at that pastor and elder, and after even eating the generous banquet noodles she kindly prepared for us, we left the temple. Although I never got to see the calligraphy of Yeomgungmun,

after hearing her story, I realized that the heart inside me—the one that had been raging and snorting in anger, a heart that had been a complete sea of fire—had somehow quietly cooled down!!!

The fire of anger in my own heart was not even truly fire!!!

And then a thought struck me: Ah—schizophrenia!!! I had never directly met a person with schizophrenia before, yet through this woman, it felt as though I had come face to face with the harsh lives of schizophrenia patients and their families.

And suddenly, my mind was jolted fully awake!

Why are people ill?

This has been the lifelong question that has stayed with me. Can't everyone live a little more peacefully and well? Why are there so many people who are suffering?

And that is why I began studying quantum field theory.