A CODER'S LIFE

Making Computers More Powerful

Philip Emeagwali

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To my wife, Dale, for being so supportive and a wonderful partner in life.

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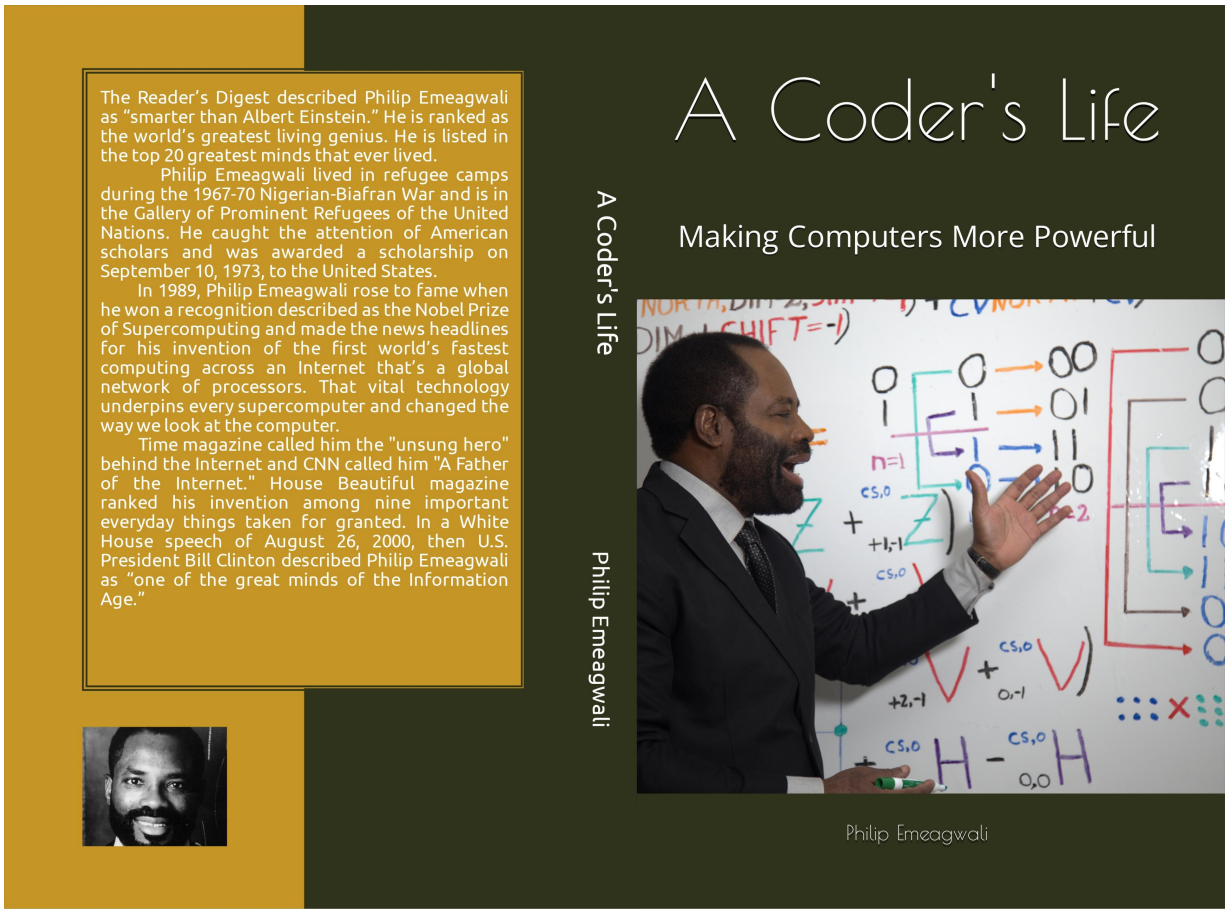


1ST LECTURE:

SUPERCOMPUTERS: MY GREATEST LOVE

Broadcast 30 September 2021

https://youtu.be/6ogkT4hkH6s

STORIES FROM THE WAR FRONT

Captured Biafran Villages Glowed in Fire

A Lone Refugee Family in a Fishing Village

In July 1969, I was in Ndoni, Biafra, fishing from a canoe that was in the middle of the River Niger. In mid-1969, I came to Ndoni with my family and as a refugee. We came to Ndoni, via Atani, and along the eastern bank of the River Niger that was controlled by the Biafran Army. The western bank was controlled by the Nigerian Army.

We came to Ndoni from the overcrowded Saint Joseph's Refugee Camp, Awka-Etiti, **Biafra**. **Ndoni** was sparsely populated by fishermen, yam farmers, and migrant settlers. **Ndoni** was teeming with **Anopheles** mosquitoes that transmitted the malaria parasites. Those mosquitoes buzzed as loud as a jet fighter. In some days in **Ndoni**, I saw more alligators than people. The alligators of **Ndoni** roamed as freely as their chickens and even entered their outdoor kitchens to steal food.

The Fall of Oguta | How I Was Drafted to the Oguta War Front

About three weeks after my family's arrival from Awka-Etiti to **Ndoni**, I was conscripted into the Biafran Army. Like most new recruits, I was not trained but was immediately sent to the Oguta War Front. Because they was no food in Oguta I was transferred back to **Ndoni**, where I was re-assigned as a cook in the Officers' Mess of the Biafran Army at **Ndoni**.

In 1969, that Officers' Mess was the only white two-story building in **Ndoni**. During the rainy season, everywhere in the riverine town of **Ndoni** is flooded. And every resident of Ndoni can fish from the doorstep of his or her mud thatched house. That Officers' Mess was where a Biafran Army captain and three Biafran Army lieutenants, including Lieutenant **Emmanuel "Emma" Akana** lived. It was also where visiting military officers and guests of the Biafran Army socialized and lived. And ate what little food that was forcefully taken at gunpoint from the market women at **Ndoni**.

I was a 14-year-old soldier and a cook in the Biafran Army. I lived in and cooked for that Officers' Mess. That Officers' Mess was where I met Major-General **Albert Okonkwo.** In

about mid-August **1969,** Albert Okonkwo visited Biafran soldiers who were defending **Ndoni.**

FIGHTING FOR THE 11TH BATTALION OF THE BIAFRAN ARMY

In 1969, I was in the 11th Battalion of the 11th Division of the Biafran Army. At various times during that 30-month-long war, our 11th Division was commanded by a flamboyant 40-year-old named Colonel Joseph “Hannibal” Achuzie. Within the Biafran Army, “Hannibal” Achuzie was the commander soldiers dreaded the most.

War front battles that were led by Colonel **Achuzie** resulted in heavy losses on both sides. **Achuzie’s** presence at the war front foreshadowed that dead bodies will soon litter the streets of **Onitsha** or **Oguta**. For that reason, **Achuzie** was nicknamed “Air Raid.” I saw Biafran soldiers change into civilian clothes and flee from the war front just because blood-thirsty “Hannibal” **Achuzie** has become their new commander.

Fighting the Third Marine Commando of the Nigerian Army

Biafran soldiers also fled from the war front when Colonel **Benjamin Adekunle** of the Third Marine Commando of the Nigerian Army was in command. **Benjamin Adekunle** was bloodthirsty. For that reason, Adekunle was nicknamed **"The Black Scorpion."**

Fighting Murtala Mohammed's Second Division

Biafran soldiers also fled from the war front when the daredevil Colonel **Murtala Mohammed** of the Second Division of the Nigerian Army was leading an attack. It was Colonel **Murtala Mohammed** that recaptured the Midwest Region from the Biafran Army.

Colonel **Mohammed** was in command when members of his blood-thirsty Second Division of the Nigerian Army recaptured Igbo-speaking villages of the Midwest Region. And recaptured them from the retreating Biafran Army. Colonel **Mohammed** was commanding the Nigerian soldiers who set mud houses that were thatched with grass on fire. The Nigerian Army had entire villages glowing on fire.

Murtala Mohammed was commanding the Nigerian soldiers who pulled civilian men and boys from their houses in Asaba and murdered them in front of their wives and mothers. On October 7, **1967**, **Mohammed** was commanding the soldiers

who murdered seven hundred [700] male civilians in **Asaba**. His war crimes and crimes against humanity earned Colonel **Murtala Mohammed** the nickname "The Butcher of Asaba."

The war front rampage of Colonel **Murtala Mohammed** was slowed down after the Onitsha **bridge**head of the River Niger Bridge was destroyed by the rapidly retreating Biafran Army. Onitsha **bridge**head was dynamited on about September 22, **1967**. With no bridge to transport **Nigerian** armored cars and do so across the River Niger, their first three attempts to capture Onitsha failed. Each failed attempt to capture Onitsha was led by Colonel **Mohammed.**

BLOODIEST BATTLEFIELD IN AFRICA!

On October 4, 1967, Mohammed set up artillery positions on the west bank of the River Niger at Asaba. During the next eight days, Onitsha was continuously bombarded with heavy artillery gunfire. I was thirteen years old.

In mid-1967, the population of **Onitsha** was one hundred and eighty thousand. And I vividly remember the chaos throughout the Odoakpu Quarters that was our neighborhood in **Onitsha**. Fifteen minutes after the artillery shelling began, Modebe Avenue of **Onitsha** was packed shoulder-to-shoulder. A hundred and fifty thousand Igbo refugees were fleeing from the **Fegge** and **Odoakpu** quarters of **Onitsha**. And fleeing in the easterly direction, towards **Oba** and **Ogidi**.

Two weeks earlier, my father had fled from the advancing Nigerian Army and from his job as a nurse in the hospital at **Agbor** (Nigeria). And he was reposted as a nurse in the hospital that was at **Awka** (Biafra). In the absence of my father, my mother, myself, and my six younger siblings fled from the artillery shelling of downtown Onitsha. We fled from our house that was at 4B Egbuna-Adazia Street, Onitsha. We fled along

Modebe Avenue. And continued along *Ugwunobamkpa* Road, towards *Énú Ọnịcha* to the house of my maternal grandfather that was at 6C Wilkinson Road, **Onitsha.**

My maternal grandfather was born and raised next to Obi Okosi Primary School, Onitsha, that was a short stroll from the Metropolitan College, Onitsha. Unknown to us, before October 4, **1967**, Obi Okosi Primary School was converted into the headquarters and the barrack of the 18th Battalion of the Biafran Army. The 18th Battalion was commanded by Colonel **Assam Nsudoh**.

Eight days later, on October 12, **1967**, Colonel **Murtala Mohammed** led fifteen thousand Nigerian soldiers in a convoy of ten-boat Armada that crossed the River Niger from **Asaba** and landed in **Onitsha**. For several days, after October 12, **1967**, Nigerian and Biafran soldiers fiercely engaged each other in house-to-house gun battles. On the early morning of October 12, **1967,** my fleeing family and others were caught in the cross fires between Nigerian and Biafran soldiers, and caught as we fled from 6C Wilkinson Road to the home of my maternal grandmother in the village of **Ogidi**.

THE FIRST SUPERCOMPUTER

How Are Supercomputers Used in Russia?

In an email, a sixteen-year-old writing an essay on famous computer scientists and their contributions to the development of the computer asked: “How are supercomputers used in Russia?”

The supercomputer market is valued at forty-five billion dollars a year. The energy and geoscience industries buy one in ten supercomputers, and use them to pinpoint oil deposits. The Romashkino Oil Field of **Russia** covers 1,600 square miles. It contains 17 billion barrels of recoverable oil reserves. It’s the largest oil field of the Volga-Ural Basin.

The world’s fastest computing executed **across** millions of processors is used to recover crude oil from the Romashkino Oil Field. In **1989**, I was in the news for discovering how the slowest processors in the world could be harnessed as the world’s fastest computer. And used to pinpoint the locations of crude oil and natural gas.

What is Philip Emeagwali Known For?

Someone asked: “What’s Philip Emeagwali known for?” At 8:15 in the morning of July 4, **1989**, in Los Alamos, New Mexico, USA, I became the first person to know the first supercomputer, as we know the world’s fastest computer today. I was the first person to discover that the one billion slowest processors in the world can be fused, via emails to emulate the world’s fastest computer.

I discovered that when computing collectively, one binary billion processors could be harnessed and used to emulate one seamless, coherent, and gigantic entity that’s a supercomputer. A binary billion is two-**raised**-to-power-32, or 4,294,967,296. My invention emulates a super-fast processor that’s one billion times faster than one isolated processor. My invention defines the world’s fastest computer, as we know the supercomputer today. The world’s fastest computing—or solving a billion problems **at once,** or in parallel, instead of solving one problem **at a time**—is what enables the supercomputer to be **super.** And enables my new Internet to be a new supercomputer, in reality.

I was in the news because I discovered the world’s fastest computing. And discovered that “final proof” at 8:15 in the morning of the Fourth of July 1989. And discovered it in Los Alamos, New Mexico, USA. And discovered it by, in part, recording the fastest computer speed. And recording it while solving the most compute-intensive problems in mathematics and

physics. And solving those grand challenges not with the fastest processor in the world but with the slowest processors in the world and **across** an Internet that's a global network of those processors.

An often-asked question in school essays **is this**: "How did Philip Emeagwali change the world?" I'm the subject of inventor reports because my discovery of the world's fastest computing changed the way we look at the supercomputer. Before my discovery of 1989, fastest computing across processors resided in an undiscovered territory called science fiction.

THE ART OF SOLVING DIFFICULT MATH PROBLEMS

An often-asked question in school essays is this: "What is the contribution of Philip Emeagwali to mathematics?"

Before my discovery of 1989, the fastest computing across a new Internet that's a new global network of sixty-four binary thousand processors and programming those processors to solve the most compute-intensive problems in mathematics and physics were as impossible as attempting to fly an airplane in the 19th century. And fly it before the first flight. At the turn of the 20th century, skeptics and spectators were questioning the first pilots: "Why do you want to fly?" the naysayers asked.

As a supercomputer scientist who came of age in the 1970s, my most frequently asked question **was this**: "Why do you want the world's fastest computer to be powered by the world's slowest processors?"

In the 1970s, my world's fastest computing was science fiction. The June 14, 1976, issue of the *Computer World* magazine published an article titled: "Research in Parallel Processing Questioned as 'Waste of Time.'"

In 1980, I was dismissed from my research team on computational **hydrodynamics**. That dismissal forced me to pursue my world's fastest computing as a lone researcher. In 1989, the news headlines in the world of supercomputing was that a lone black mathematician in Los Alamos, New Mexico, USA, had made a ground-breaking discovery that will change the way we look at the fastest computers.

I **discovered** that 65,536 processors can be used to compress 180 years of **time-to-solution** of the hardest problems in science, engineering, and medicine. And compressing them to one day of **time-to-solution**. I'm the African supercomputer scientist in the news, in 198**9**. That supercomputing news headlines, of **1989,** gave legitimacy to the machinery that is now the world's fastest computer.

What is Philip Emeagwali Famous For?

People also ask: "What is Philip Emeagwali famous for?" Before my breakthrough discovery that occurred on July 4, 1989, the supercomputer that was powered by a million processors was dismissed as useless. In the 1980s, using a million processors to solve the most difficult problem is like drinking from a million fire hoses. My discovery made the news because it was the first

time the world's fastest computer was powered by thousands of the world's slowest processors.

That controversial supercomputer was the proverbial stone that was rejected as **rough** and **unsightly** but became the **headstone** of the high-performance computing industry. I'm the subject of school essays because I **invented** the first supercomputing **across** the world's slowest **computers**.

In 1989, I was in the news because my new knowledge that the fastest computer can be built with the slowest processors **opened the door** to the high-performance computer which now computes fastest. And does so by solving up to a billion problems **at once** and addressing some of the world's biggest challenges.

Diary of a Black Supercomputer Scientist

On June 20, 1974, I began learning how to program a supercomputer at 1800 SW Campus Way, Corvallis, Oregon, USA. Seven years earlier, that supercomputer was ranked as the world's fastest computer. I began programming supercomputers three months after I arrived in the USA. And at age nineteen. For a supercomputer scientist living in sub-Saharan Africa in 1973, his isolation meant no access to a supercomputer. To this day, access to the world's most powerful supercomputer is limited

because the fastest supercomputer in the world costs the budget of a small nation, or one billion two hundred and fifty million dollars.

What is Philip Emeagwali Famous For?

If the 1970s was the **sowing** and **planting** decade for harnessing millions of processors in tandem, a technology then described as a pseudoscience and dismissed as a tremendous waste of everybody's time, then the 1980s was the **harvest decade** for the fastest computing **across** the slowest processors. In **1989**, it made the news headlines that an African genius in the USA has discovered that parallel processing is not "a waste of time."

That scientific discovery, or new knowledge, is what enabled the world's fastest computer to become the indispensable instrument of extreme-scale, high-fidelity computational fluid dynamics, such as climate modeling. I—**Philip Emeagwali**—was that person, the first supercomputer scientist to discover how to solve the world's most compute-intensive problems in science, engineering, and medicine. Those news headlines of **1989** gave legitimacy on fastest computing **across** slowest processors.

The Art of Uncracking the Math Code

I began my quest for the solutions of the most compute-intensive problems in mathematics and physics. I began that quest from Onitsha, **Nigeria,** in June **1970**. I began with a 568-page blue hardbound textbook that was titled: "An Introduction to the Infinitesimal Calculus." The book was subtitled: "With Applications to Mechanics and Physics." And was written by G.W. [George William] Caunt and published by Oxford University Press. My mathematical quest for how to solve the most difficult problems in calculus and physics continued on June 20, 1974. And on the fastest supercomputer in the Pacific Northwest region of the United States.

For the next decade and a half in the USA, I continued my quest from the partial **differential** equation beyond the frontier of calculus to the partial **difference** equation of large-scale algebra that's the cornerstone of computational physics.

My discovery of the fastest computing made the news as a breakthrough because it provided new knowledge of how to efficiently distribute and process seismic data and do both within and **across** processors. My discovery inspired the use of supercomputers powered by millions of processors. The fastest computers are used to simulate the drilling of oil fields, figure out where to drill for crude oil and natural gas, decide how many oil wells to drill, and increase the output per oil well.

HOW TOUGH MATH ARE SOLVED

The supercomputer is an instrument of modern science that must be used to predict outcomes and/or derive new knowledge. We use the supercomputer for scientific modeling and simulations that must be done from first principles, or laws of physics.

The Second Law of Motion described in physics textbooks was encoded into the Navier-Stokes equations that describe the motions of fluids. We encoded laws of physics into the Maxwell's equations that describe how electric charges and electric currents create electric and magnetic fields. Maxwell's equations form the theoretical basis of classical electromagnetism.

We encoded some laws of physics into systems of partial **differential** equations that are the most recurring decimals in supercomputer codes. The next world's fastest computer can comprise of up to one thousand cabinets, each the size of a refrigerator. A supercomputer can consume as much electricity as a Nigerian state.

If the supercomputer is shrunk from its current size of a soccer field to its former size of a refrigerator, the world's most

powerful supercomputer will roar as loud as a **jet aircraft**. Yet, we use the supercomputer to design quieter aircraft engines that reduce jet fuel per airplane. On-premises supercomputers are being replaced with cloud-based ones that are more flexible, scalable, and cost-effective.

Back from 1922 through 1989, the fastest computing across the slowest processors existed only in the realm of science fiction. Since my discovery that occurred on July 4, 1989, the world's fastest computer had enabled us to incorporate previously unimaginable points of data. And make ground-breaking discoveries in science, engineering, and medicine.

The fastest computing enables us to know if a new cancer treatment holds any promise or if an untested scientific theory is valid. Such scientific discoveries, include deepening our understanding of the cosmos and our place within the cosmos.

How I Discovered the World's Fastest Computing

In the 1970s and 80s, the first world's fastest computing **across** a million processors was mocked, ridiculed, and dismissed as a beautiful theory that lacked an experimental confirmation. The fastest computing **across** processors that solved problems in tandem was a technology that meandered

across physics, mathematics, and computer science. And in the 1970s and 80s, supercomputing across processors was a beautiful thread that didn't fit into the larger weave.

That world's most powerful supercomputer now occupies the space of a soccer stadium. And it costs the budget of a small nation. That world's fastest computer is used to foresee long-term global warming. And pinpoint the locations of crude oil, injected water, and natural gas that were flowing **across** an oil producing field. Such oil fields are up to 7.7 miles (or 12.4 kilometers) deep, or eight times the length of the Second Niger Bridge at Onitsha. An oil field can be up to twice the size of Anambra, that is my state of origin in my country of birth, **Nigeria**. As I wove my emails around my one binary million email pathways, I discovered that fastest computing across processors brought **depth** and **complexity** that took me a decade and a half to fathom.

But everything came together when the unknown became known at 8:15 in the morning of July 4, 1989, in Los Alamos, New Mexico, USA. And came together when my answer to the big question which I **first** pondered on June 20, 1974, in Corvallis, Oregon, USA, became newspaper headlines. It was mentioned in the June 20, 1990, issue of *The Wall Street Journal*. The reason my discovery of the fastest computing made the news headlines was that it opened the gate of knowledge to the world's

fastest computer that’s expected to become the computer of tomorrow.

PHILIP EMEAGWALI

INTERNET

First World's Fastest Computing Across an Internet

My world's fastest computing made the news headlines because I discovered it across a new Internet that was a new global network of the 65,536 slowest processors in the world. My discovery enabled the large-scale computational physicist to have a deeper understanding of the most difficult problems that arise at the frontier of mathematical physics. And understand physics through large-scale experiments executed on the world's biggest computers that has the footprint of a football field.

I discovered how to plumb the depths of physics. And how to do so **across** a new Internet that's a new global network of off-the-shelf processors. Those processors were identical and equal distances **apart**. To produce a scientific discovery is to contribute to the body of scientific knowledge.

Nine out of ten supercomputer cycles are consumed by large-scale computational physicists who run codes that were governed by laws of physics and that were, first, encoded into

calculus and then reduced to algebra and codes. The supercomputer is the scientist's best friend.

Contributions of Philip Emeagwali to Physics

People also ask: "What did Philip Emeagwali contribute to physics?" My contributions to physics **were these**: First, I discovered the world's fastest computing. That contribution puts more computing into the computer. That new knowledge underpins and increased the body of knowledge of extreme-scale computational physics.

Second, I discovered how to speed up the **time-to-solution** of the world's most compute-intensive problems in computational physics. Third, I discovered how to reduce **times-to-solution** from 65,536 computing-days, 180 computing-years, within one processor to one supercomputing-day **across** an ensemble of 65,536 processors. In **1989**, I was in the news because I discovered how to reduce 180 computing-years to one supercomputing-day.

Fourth, my discovery of the world's fastest computing is the reason for school essays on Philip Emeagwali. Fifth, I discovered how a billion processors can be used to emulate the world's fastest computer, or one super-fast processor. Sixth, I **discovered**

how to harness a new supercomputer that then existed only in the realm of science fiction. Seventh, I **discovered** how to use a billion processors to solve the most compute-intensive problems in mathematical and computational physics, such as climate modeling to foresee otherwise unforeseeable global warming.

My scientific discovery is a contribution to mathematics and physics because that new knowledge extended the frontier of knowledge of mathematical physics. And extended it by **nine** partial differential equations, called the Philip **Emeagwali equations.**

The Philip **Emeagwali equations** governed the flows of crude oil, injected water, and natural gas that were flowing up to 7.7 miles (or 12.4 kilometers) deep. And flowing **across** an oil producing field that's the size of Port Harcourt, **Nigeria**. The Burgan sandstone oil field of Kuwait could yield 72 billion barrels.

My invention is a contribution to modern physics because it was new knowledge of how to solve a **billion** problems of mathematical physics and solve them **at once.** That invention extended the frontier of knowledge of large-scale computational physics and extended it by a factor of one **billion**.

The world's fastest computing is my contribution to physics. My new knowledge made the news because it was beyond the boundaries of known mathematics, physics, and

computer science. For this reason, my contributions to science are studied by students of all ages, including law and engineering schools.

My quest for the new knowledge of how to compute f**aster** and speedup 30,000 years of **time-to-solution** to one day was my intellectual homecoming. I had to leave my scientific home that was physics, in 197**0**. For the next twenty years, I sojourned like a supercomputing troubadour, or medieval lyric poet, who invented equations in the manner **Bob Marley** wrote songs.

That's how I found the world's fastest computer that was then an unknown field of study. From a supercomputing perspective, my contributions to physics **were these**: I discovered extreme-scaled computational physics **across** my new Internet that's a new global network of 65,536, or two-**raised**-to-power sixteen, off-the-shelf processors that shared nothing. Each processor operated its operating system.

To contribute to computational physics demanded that I leave the introductory physics that I learned in Onitsha, **Nigeria**, in the year **1970.** And learned after living in refugee camps during the three preceding years. During my twenty years of full-time studies of mathematics, physics, and computer science that followed 1970, I gained mathematical maturity and a **more profound** and **surer** understanding of the laws of motion of

physics that were discovered three centuries and three decades ago.

EXPLORING THE UNKNOWN WITH PHILIP EMEAGWALI EQUATIONS

Initial-boundary value problems that are governed by a system of partial differential equations that encode a set of laws of physics must be used to model phenomena, such as those arising in fluid flows, electrodynamics, electrostatics, elasticity, heat, sound, and quantum mechanics.

As an aside, to invent a partial **differential** equation is not an easy task. Most partial **differential** equations were invented a century and half ago. Only a dozen mathematicians had invented important partial **differential** equations which were named after them. Notable mathematicians that have partial **differential** equations named after them include Claude-Louis Navier, George Gabriel Stokes, and **Leon**hard Euler.

Fluid dynamics is the most important topic in physics. And is also my specialty as a physicist. The need to simulate the internal dynamics of flowing fluids—called the fluid dynamics—is the reason ninety percent of the cycles executed on the world's fastest computers are consumed by physicists—called computational fluid dy**na**mi**c**s engineers. This is the reason the

fastest computers are used to study and understand long-term climate change.

The partial **differential** equation is the natural dialect of computational fluid dynamics. The **nine Philip Emeagwali equations** enabled me to see forces that will be otherwise invisible. And describe the motions of crude oil, injected water, and natural gas that will be otherwise indescribable. It was an epiphany to realize that I had to leave my old calculus textbooks behind to discover my new calculus for supercomputing. My calculus is called the nine Philip **Emeagwali equations.**

I discovered new calculus **across** my new global network of sixty-four binary thousand processors that's my small Internet, *in reality.* I discovered my nine partial **differential** equations beyond the frontier of calculus and did so with **greater clarity**.

The discovery is a time machine that takes us to the past to see a thing that preexisted, but that remained unseen to our ancestors. **The invention enables us to create the future of our descendants.**

2ND LECTURE: UNRAVELLING COMPLEX EQUATIONS WITH THE WORLD'S FASTEST COMPUTING

Broadcast 30 September 2021

https://youtu.be/UEwRHaSeBPQ

The Epic Quest for the Fastest Computing

The biggest question in computer science is this: "How can we use the slowest processors in the world to solve the most compute-intensive mathematical physics problems in the world and solve them at the world's fastest computer speeds?"

I invented how to solve the most compute-intensive mathematical physics problems—called extreme-scale computational fluid dynamics. And solve them **across** a new Internet that's a new global network of up to one billion processors. My contribution to computational physics made the news headlines in 1989.

Breaking the Glass Ceiling: A Black Mathematician in a White Space

I'm a Nigerian-born who is studied in American schools. In the U.S., I'm defined **first** by my race and **second** by my science. In his book "The Souls of Black Folk," which was published in 1903, the sociologist W.E.B. Du Bois wrote that: "The problem of the twentieth century is the problem of the color-line."Seven decades later, I immigrated from **Nigeria** to the USA. And I

experienced that color-line as the fundamental problem of American science.

I'm often asked: "How much racism is there in modern American science?" The facts speak for themselves. When I began programming the fastest computers, back on June 20, 1974, in Corvallis, Oregon, USA, there was only one Black family that owned a house in Corvallis, a city of 36,000 persons. And there were more Black Popes than Black scientists listed in the top one hundred most outstanding scientists of all time.

In modern times and era of gigantic supercomputers, that each occupies the space of a soccer field and cost a billion dollars each, it is impossible for a supercomputer scientist to produce a breakthrough discovery alone. To win the Nobel Prize of Supercomputing demands hiring a large team of research scientists. And then taking the credit for their collective contributions to supercomputing.

It made the news headlines, in 1989, that an African supercomputer genius in the USA that worked alone has solved the most compute-intensive mathematical problem in physics. And solved it **alone**. I'm the **Nigerian** that was in the news, back in 1989, for recording the world's fastest speed in computing. I have posted on **YouTube** one thousand closed-captioned videos in which I explained how I solved that compute-intensive problem.

Unlike my one-person fastest computer of the 1980s, the sequencing of the human genome published in February 2001 was completed by two teams of 10,000 scientists. Only a handful of those scientists were **Black**, even though the human genome was analyzed with the fastest computer that originated from a black mind. That lack of diversity in science speaks volumes about the blatant racism that permeated the American scientific world. Black scientists were hampered while struggling to contribute to using the fastest computers to cure new diseases, create new drugs, and modify our DNA. Supercomputers were used to study the **3.1 billion** pairs of DNA bases.

In 1989, I was in the news for recording **3.1 billion mathematical calculations** per second. And for winning the Nobel Prize of Supercomputing. As far as I know, I was the only Black person out of the 25,000 supercomputer scientists of the 1980s. But had I been employed as part of a thousand person supercomputing team, I would have been coerced to become the lowest ranking member of that research team. The team leaders would have made me their equivalent of the hewer of wood and drawer of water. As a one-person band, I became the inventor of a new supercomputer that's a new Internet that's the subject of essays on famous inventors and their inventions.

UNRAVELLING THE MYSTERY BEHIND PHILIP EMEAGWALI EQUATIONS

Singing a song is a lesser contribution to music than writing the original song. You can't win the Grammy Award for merely singing an old song. Similarly, learning (or teaching) calculus is zero contribution to the existing body of mathematical knowledge. But contributing new partial differential equations to the twenty-first century calculus—such as the nine Philip Emeagwali equations—and showing for the first time how to use the slowest processors in the world to solve the most compute-intensive problems in the world, particularly, equations that can arise beyond the frontiers of calculus, algebra, physics, and computing, and recording the fastest computer speed and doing so as the proof of such an accomplishment, was my contribution to science.

That contribution made the news headlines, in 1989. That discovery is the reason I see twelve-year-olds in U.S. public libraries writing school essays on the contributions of **Philip Emeagwali** to science.

Contributions of a Nigerian to Mathematics

The young **Nigerian** mathematician is inspired the most when she watches on YouTube one thousand video lectures covering the contributions of a **Nigerian** to mathematics, physics, and computer science. My contributions to knowledge range from new algebra that redefined the boundaries of the largest-scale algebra in computational physics. And new partial **differential** equations that expanded twenty-first century calculus. And new computational physics that pushed the frontiers of modern mathematical physics. Parallel processing increases the speeds of the fastest computer on a desktop and in the world.

If you go to YouTube and put in the following search terms: "contributions of Americans to mathematics" or "famous mathematicians" or "**contributions of Americans to physics**" or "contributions of Americans to computer science." For those search terms, and you will find that **Nigeria** and **Africa** are now well represented.

It's difficult to inspire a young **Nigerian** mathematician to labor for the rest of his life and do so to contribute new partial **differential** equations to twenty-first century calculus and do so if he can't name a **Nigerian** who also invented new partial

differential equations. Because my contributions to mathematics received media coverage, I wasn't surprised to receive emails from young Nigerian mathematicians also undertaking to invent new partial **differential** equations. And invent them just like I did.

UNLOCKING THE SPEED OF LIGHT: CREATING THE WORLD'S FASTEST COMPUTING

Scientists become research scientists by first becoming an apprentice scientist and learning for ten years. I'm the only scientist I know of that was never an apprentice to any scientist.

My supreme quest for the fastest speed in computing began on June 20, 1974, at 1800 SW Campus Way, Corvallis, Oregon, USA. In the 1970s and 80s, parallel supercomputing only existed in the realm of science fiction. The June 14, 1976, issue of *Computer World*, a major publication, carried an article that was titled: "Research in Parallel Processing Questioned as 'Waste of Time.'"

My 1980s Years as a Supercomputer Scientist

My technological quest was to discover the parallel-processed supercomputer solution to the world's most compute-intensive problems in mathematics and computer science. And to harness the slowest processors and use them to solve the most

compute-intensive problems and solve such problems at the fastest computer speeds. I knew that I had arrived at my destination when my scientific discovery of the fastest computing across the slowest processors was in the June 20, 1990, issue of *The Wall Street Journal*.

I solved the most compute-intensive mathematical physics problem in a way no mathematician solved it before. I knew that my breakthrough was momentous because I got phone calls from the likes of **Steve Jobs. Steve Jobs** was then heading Pixar Animation Studios and it was after they fired him from his job as the CEO of Apple. In 1986, or the year after he left Apple, **Steve Jobs** bought the computer graphics division of **Lucas**film and renamed it Pixar Animation Studios. **Steve Jobs** wanted to know if and how my breakthrough of the fastest computer speed across the slowest processors can be used to reduce the wall-clock **time-to-solution** of image rendering software that were executing on his workstation computers, then called NeXT.

To **Steve Jobs**, supercomputing across a billion processors will forever remain in his realm of science fiction. The June 10, **2008,** issue of The *New York Times*, quoted **Steve Jobs** as telling Apple's Worldwide Developers that: "The way the processor industry is going is to add more and more cores, but nobody knows how to program those things," **Steve Jobs** continued: "I mean, two, yeah; four, not really; eight, forget it."

5,000 Authors of 5,000 Words

Some academic scientists publish seventy papers a year. A short physics paper had 5,154 co-authors. Twenty-four pages of the 33-paged paper were used to list the names of its 5,154 co-authors. Some of those co-authors could merely have contributed a comma or a period. Each year, two-and-a-half million scientific papers are published. Fifty million scientific papers were published in previous years.

The modern research scientist is not focused on making a discovery. But is on his quest to write a scientific paper that no scientist will likely read. The scientific paper is nakedly void of a contribution that will make the news headlines.

Why I Stood Apart

The **Emeagwali** YouTube channel has one thousand closed-captioned videos on my contributions to science. As an inventor who came of age in the 1970s and 80s, I had little interaction and zero collaboration with other inventors.

I'm the only prominent scientist of the 21st century who stands solely on his contributions to science. That's in contrast to the contributions of a diverse team of up to one thousand

multidisciplinary and interdisciplinary teams of applied mathematicians, computational physicists, and computer scientists.

I'm Well-Known But Not Known Well

In the 1980s, the decade I came of age, they were about a thousand prizes and awards in science. In 1989, I won highest award in supercomputing. That recognition gave me credibility. It's the reason I'm well-known, but not known well.

For the twelve-year-old to write an essay on the contributions of the most famous inventors is to venerate, worship, **adore**, and be in awe of those inventors' contributions to society. We venerate **Albert Einstein** for his contributions to modern physics. But your geometry teacher will not be worshiped for teaching you the **Pythagoras theorem** of geometry—nor worshiped like **Pythagoras** or like **Euclid** who is the father of geometry. But your algebra teacher will not be worshiped for teaching you the quadratic equation of algebra—nor worshiped like Muhammad ibn Musa al-Khwarizmi who is the father of algebra.

Nor will a brilliant student be held in awe and profiled by historians of mathematics for merely mastering how to solve the initial-boundary value problem of calculus and physics that was

governed by a system of partial **differential** equations. He will not be held in awe for finally understanding known mathematics and computer science, such as solving boundary value problems on the fastest supercomputer that was **outlined** and **defined** and powered by up to a billion processors. That was my signature discovery that I made on July 4, 1989.

PHILIP EMEAGWALI

INTERNET

If my invention that was an ensemble of processors was represented by a phonograph record, the fastest supercomputer in the world will be the B-side of that record. And the Internet that's a global network of processors will be its A-side. On July 4, 1989, I discovered how the slowest processing across a new Internet that was a new global network of the slowest processors could be harnessed. And used to solve compute-intensive problems.

In 1989, I expected the **A-side** that is my Internet to be my chart hit. However, the DJs (Disc Jockeys) of the world of supercomputing were mandated to recognize the supercomputer, not the Internet. The judges of the highest award in supercomputing "played" only the **B-side** that represented the new world's fastest computer. That **B-side** won the most prestigious prize in supercomputing and, later, went on heavy rotation and repositioned itself as the new **A-side** that everybody remembers. So the earliest write-ups on my invention focused on my fastest supercomputer speed, not on the machinery which I used to achieve that world-record speed.

That machinery was my new Internet that was a new global network of sixty-four binary thousand processors (or, equivalently, 65,536 computers) that were uniformly distributed **across** the surface of a globe. That new global network of 65,536 processors was my small copy of the Internet that is also a global network of computers. That new global network of 65,536 computers is called the Philip Emea**gwali Internet**.

Where Are the Geniuses?

My contribution to the invention of the first world's fastest computer that computes with up to one billion processors was in the June 20, 1990, issue of The *Wall Street Journal* and in YouTube. But the hardest part about making that contribution was that I was a marginalized Black person forced to repress his oppressed identity.

In 1989, I had to pretend I was white. I hid my racial identity to enable me to win the highest award in supercomputing. In the sixteen years before winning that supercomputer prize, I learned that the American academia is a fortress. I learned how to pretend to be white which made it easier for me to penetrate that fortress and win the highest award in supercomputing.

The most prominent scientists, including **William Shockley** and **James Watson**, are the most likely to hold the belief I was

less intelligent than **Albert Einstein**. Shortly after I discovered fastest computing arising from slowest processing, prominent supercomputer scientists who didn't know that I was **Black** wrote that I was a supercomputer genius. That was when I became ranked with the likes of **Galileo**, **Isaac Newton**, and **Albert Einstein.** And how I later appeared on two postage stamps.

In 1974, the year I began programming the fastest computers, I was in Corvallis, Oregon, USA. The field of computer science was then nearly as white as a posh country club of the 1950s Alabama. As a Black supercomputer scientist giving a lecture to white research mathematicians and doing so in the early 1980s, those mathematicians were taken aback at my command of scientific materials.

They were surprised that I was teaching them how to solve my new system of coupled, nonlinear, and time-dependent partial **differential** equations that arise beyond the frontier of calculus. And that govern initial-boundary value problems of physics. The poster girl of such problems is the three-phased flows of crude oil, injected water, and natural gas that were flowing along three spatial dimensions. And flowing **across** porous media that were both heterogeneous and anisotropic. In 1989, I was in the news because I was the first mathematician to figure out how to solve

the most compute-intensive problems. And how to solve them **across** up to one billion processors.

In the early 1980s, many white mathematicians had a lower expectation for me. Their lower expectations arose from their ingrained belief that a Black research mathematician lacks the intellect of Albert Einstein. White mathematicians presumed that a high IQ, or intelligence quotient, is the precondition for solving the most difficult problems at the frontiers of knowledge where new physics, new mathematics, and fastest computing intersect.

As the first Black person to win a scientific award that was compared to the Nobel Prize, and do so in 1989, and as the only person, Black or white, to win that prize alone, **I was devoured like a lamb and my garments were soiled in mockery**. I survived vicious criticisms that were full of bitterness and hate. And I have the scars to prove them. The world's fastest computer speed which I recorded **across** my ensemble of the slowest 65,536 processors in the world and which I discovered on the Fourth of July 1989 made the news headlines because it was a milestone in computer history.

MASTER OF MACHINE AND COMPUTING MILESTONE

That milestone marked the beginning of the most powerful supercomputer that's powered by millions of processors that shared nothing. I was the only person who figured out how to harness those separate, but coupled, processors. And how to harness them as one seamless, coherent, and gigantic supercomputer which can be used to solve the most compute-intensive problems in mathematics, science, and engineering.

I was the first person that figured out how to use up to one billion processors to solve compute-intensive problems that will arise in mathematics, physics, and computer science. The reason my contribution to computer science is studied in schools is that fastest computing **across** ordinary processors has withstood the test of time.

Writing the history of the supercomputer that processes **across** processors and writing it without crediting the person who first discovered fastest computing is like producing the play Hamlet without the Prince of Denmark.

Why Jealousies Arose

In 1989 and after I won the highest award in supercomputing, I became sought after by the news media. And hate groups openly resented that a young Black sub-Saharan African has become the public face and pioneer of the new computer science that's defined **across** a million processors. The typical newspaper headline **was this**: "African Supercomputer Genius Wins Top U.S. Prize."

Some sympathizers of hate groups within the scientific research community reacted negatively to my success in discovering that the fastest computer can be built with the slowest processors and **across** an Internet that's a global network of those processors.

They did so by blackmailing me and by sabotaging my supercomputer research. And by trying assiduously to destroy my reputation. They protested when I was ranked the greatest computer genius that ever lived. And they tried to prove that I wasn't a genius. Towards that end, they made strenuous efforts to water down my contribution to the development of the computer.

In 1989, I was blackmailed and coerced to agree to share the credit for my invention of the fastest computing **across** the slowest processors. The scientific community in Ann Arbor

(Michigan) blackmailed me because I refused to share the credit for my supercomputer discovery of how to solve the most compute-intensive problems.

I was in the news because I discovered how to solve the most compute-intensive problems in computer science and physics. And how to solve them **across** a new Internet that's a new global network of up to one billion processors.

Fighting Institutional Racism

A newspaper reporter said that he was threatened and warned not to publicize my discovery of fastest computing. White reporters dropped my story after discovering that I was Black. Yet, it was ironic that those white mathematicians who complained the loudest never published a joint mathematical paper with a Black mathematician as their co-author.

As a Black mathematician who came of age in the 1970s in Corvallis (Oregon) and early 80s in College Park (Maryland), my access to vector supercomputers that were owned and operated by the U.S. government were revoked after the supercomputer administrators discovered that I was Black and of sub-Saharan African ancestry. I was banned from programming the vector supercomputer that was owned by the U.S. National Science Foundation and located in San Diego, California.

I was also banned from programming the vector supercomputer that was owned by the U.S. National Weather Service and located in Camp Springs, Maryland. Yet, I was compelled to pay taxes even though I couldn't use the forty million dollars vector supercomputers that were bought with my Black tax dollars. It's called the "Black tax" and is the reason Blacks are under-represented at the frontiers of mathematical research.

Seymour Cray was the thought leader in the vector supercomputer world of the 1970s and 80s. Over a thousand scientists assisted **Seymour Cray** in co-developing his vector supercomputers. **Seymour Cray** received billions of dollars in U.S. governmental patronage. Nevertheless, **Seymour Cray** believed that parallel supercomputing will forever remain in the realm of science fiction. In contrast, I wasn't assisted by any supercomputer scientist. And I wasn't given any money. Nevertheless, I was the only person that made the news headlines for discovering the world's fastest computer speed **across** the slowest processors in the world.

My contribution to computer science **is this**: I discovered how to turn a supercomputer technology that was mocked as controversial, ridiculed, and dismissed as science fiction and make it the reality that is now the world's fastest computer. In the world of the fastest computers, I, not **Seymour Cray**, was person

zero and the lightning rod that changed the way we look at computing **across** millions of processors.

BACKLASH FROM MY FAME

I'm a large-scale computational fluid dynamics engineer. I was the first person to understand how millions of processors should be used to solve the most compute-intensive problems. And solve the world's most important and complex challenges in mathematics, science, and engineering.

Since 1989, I was lampooned by white nationalists who spread the misunderstanding that I knew less than the likes of Albert Einstein. Their lies were disproved by physicists who watched my physics lectures that were posted on YouTube. Once I achieved fame, in 1989, I became a threat to white supremacists who strove to diminish my contributions to developing the fastest computers.

Their personal attack on me was sponsored and orchestrated. Some jobless Nigerians in Nigeria confessed they were paid to publish negative information that should prove that I'm not as intelligent as Albert Einstein. After my news headlines of 1989, I became the new Antichrist of the world of predominantly white science. It was my invention of the world's fastest computing that provoked the negative backlash against me.

An inventor who didn't receive a negative backlash, didn't make a ground-breaking invention that changed the way the world of technology looked at things.

After my scientific discovery, of fastest computing **across** millions of processors, which occurred on the Fourth of July 1989, I was repeatedly attacked. I was attacked for the same reasons the soccer striker who is his team's scoring threat is always drawing the attention of three terrorized defenders. I was attacked because fastest computing **across** the slowest processors was a fundamental change and a strategic technology.

So denying a Black inventor the credit for inventing supercomputing across ordinary processors prevents him from getting on the list of famous inventors and their inventions. For example, the **Emeagwali** Supercomputer was renamed to something **generic.** It was renamed to deny credit to its Black inventor who was born in sub-Saharan Africa.

Before my invention, which occurred on July 4, 1989, I wasn't a threat to white supremacists. And I wasn't publicly attacked by them. That was the reason, I *de facto* became the defrocked priest of supercomputing deprived the right to invent a **new supercomputer** that's a new Internet. And without a supercomputer, I became like a boy without his favorite toy.

The Supercomputer Emerged from Science Fiction

Before 1946, the programmable computer existed only in the realm of science fiction. Before July 4, 1989, the knowledge of how to program an ensemble of a billion coupled processors and how to program them to **work together** as one seamless, coherent supercomputer that can solve the most compute-intensive problems only existed in the realm of science fiction.

The June 14, 1976, issue of the influential magazine, *Computer World*, published an article that was titled: "Research in Parallel Processing Questioned as 'Waste of Time.'" So, it came as a surprise to vector supercomputer scientists when I announced that I've discovered how an ensemble of the slowest processors can be used to solve the most compute-intensive problems and record the fastest speeds in supercomputing. My discovery meant that parallel processing wasn't a waste of time. I invented parallel supercomputing, on July 4, 1989, in Los Alamos, New Mexico, USA.

My Visions of Computing in Year Million

Our prehuman ancestors of one million years ago weren't humans. Therefore, our posthuman Gods of Year Million could

be cyborgs—or part intelligent matter and part human. Our posthuman Gods could be both the creator and the created and might acknowledge us as their co-creators.

Where Are the Black Geniuses?

I was the first person of African descent to break the racial barrier that was at the crossroad and at the frontiers of mathematics, physics, and computer science. For that reason, I was the first lone investigator to win the highest award in supercomputing. I stood out because I won that prize alone. Other co-winners did so as part of a diverse, talented, multi-institutional, and interdisciplinary research team of up to fifty co-winners. I won that prize alone because I entered deep into and beyond the frontiers of science. I'm often cross-listed and studied in American schools with famous scientists, such as **Galileo Galilei**, **Isaac Newton**, and **Albert Einstein**.

But at first and in **1989**, I wasn't accepted as other famous scientists who were white. The earliest news headlines about my invention of fastest computing drew the anger of white supremacists, especially those within academia.

Reliving 1940s American Racism in the 1970s

In **1989**, I was in the news. Unknown to me, I had broken a color barrier. And did so by winning an award that computer scientists referred to as the Nobel Prize of Supercomputing. That attention drew jealousy.

As a Black inventor who came of age in the 1970s, I relived the racism **Jackie Robinson** experienced three decades earlier. And for breaking the color barrier in baseball. Nine years earlier, **Jesse Owens** was scorned by Adolf Hitler for breaking three world records and earning the title "The World's Fastest Human."

On July 4, 1989, I broke the world record in computer speed. For that reason, some called me "One of the World's Fastest Humans." But I was fastest in calculations, not in track and field. But I broke the speed record not with the world's fastest supercomputer, as expected. But **across** the slowest processors in the world.

My contribution to computer science made the news because it was then impossible to use a million processors to solve the most compute-intensive problems in mathematics and physics. Here we are, I said to myself, its 1989, and I was getting the **Jackie Robinson** treatment. And getting as many cold shoulders as **Jackie Robinson** received in 1945. I was receiving negative feedback for a very important scientific discovery for

which I won the most prestigious prize in supercomputing. That negative feedback occurred because white scientists discovered that I'm Black. And born in **Nigeria**. For that reason, they stopped giving me the top awards in science, even though I was the living scientist that's the most mentioned in school essays.

Who is a Genius?

In an email, a thirteen-year-old writing an essay on great mathematicians and their contributions to mathematics **asked me**: "Are you a Black genius?"

The genius is the **ordinary** person that found the **extraordinary** in the **ordinary**. If you can see something that I can't see and that thing does not exist, then you're not a genius. But if I see something that you can't see and that thing exists, then I'm a genius.

A Genius Must Put Time-in-Grade

To be called a genius does not mean you must know everything in mathematics, physics, and computer science. The genius who solves the most difficult problem in supercomputing must, foremost, put in his time-in-grade in his studies of calculus, algebra, physics, and computing. That genius must know a lot

about the partial **differential** equation. And do so because such equations are the most important in the world of science.

The partial **differential** equation is the most recurring decimal in supercomputing. In the 1980s, only one in a million mathematicians possessed the mathematical maturity that was needed to harness up to a billion processors that shared nothing. That mathematician must be able to use a global network of processors and use them to solve the most compute-intensive problems. In 1974, I visualized that global network as my new Internet.

My research quest was to discover how I must harness a billion processors and do so in their totality. And use those processors to solve my **discretized** system of partial **differential** equations of calculus, or instead, my newly derived partial **difference** equations of computational linear algebra, that must be used to simulate **global warming** that otherwise would be impossible to simulate.

I know how to solve this difficult problem because I was the first mathematician who solved it. I was the first mathematician to solve a Grand Challenge Problem. And solve it **across** a then world-record ensemble of 65,536 processors. I pictured my processors as encircling a globe. And doing so just as computers encircle the Earth.

My contribution to the invention of the first world's fastest computer, as it's known today, made the news headlines. I was described as the genius in the USA who won the highest award in supercomputing. And did so for solving the Grand Challenge Problem of mathematics and solving it on July 4, 1989, in Los Alamos, New Mexico, USA.

For this reason, it should not come as a surprise that I'm the only research mathematician or physicist or computer scientist who shared one thousand closed-captioned videos on YouTube. If you do a YouTube search on contributions to mathematics, physics, and computer science, you will see that the name "Philip Emea**gwa**li" is the most recurring decimal.

Struggles as a Black Inventor

I'm a computer scientist who came of age in the 1970s. Since June 20, 1974, in Corvallis, Oregon, USA, I was searching for new equations that's never been scribbled on any blackboard. And searching for new physics that's outside the textbook. And searching for the world's fastest computer.

Towards that quest, I flaunted my uncompromising theories, such as sending and receiving emailed codes. And sending them **across** a new Internet that's a new supercomputer. And that's a

global network of processors. As my act of protest against the racism that I experienced, I pursued a controversial way of the first supercomputing **across** the world's slowest computers. Due to that controversy, my discovery of fastest computing was rejected in November 1982 and September 1983. In the early 1980s, I expected my discovery to be always rejected.

Seven years later, and in 1989, rather than bringing me more ridicules and rejections, my invention of the first supercomputing **across** the world's slowest **computers** propelled me to the front pages of newspapers and science publications.

The Importance of Supercomputers

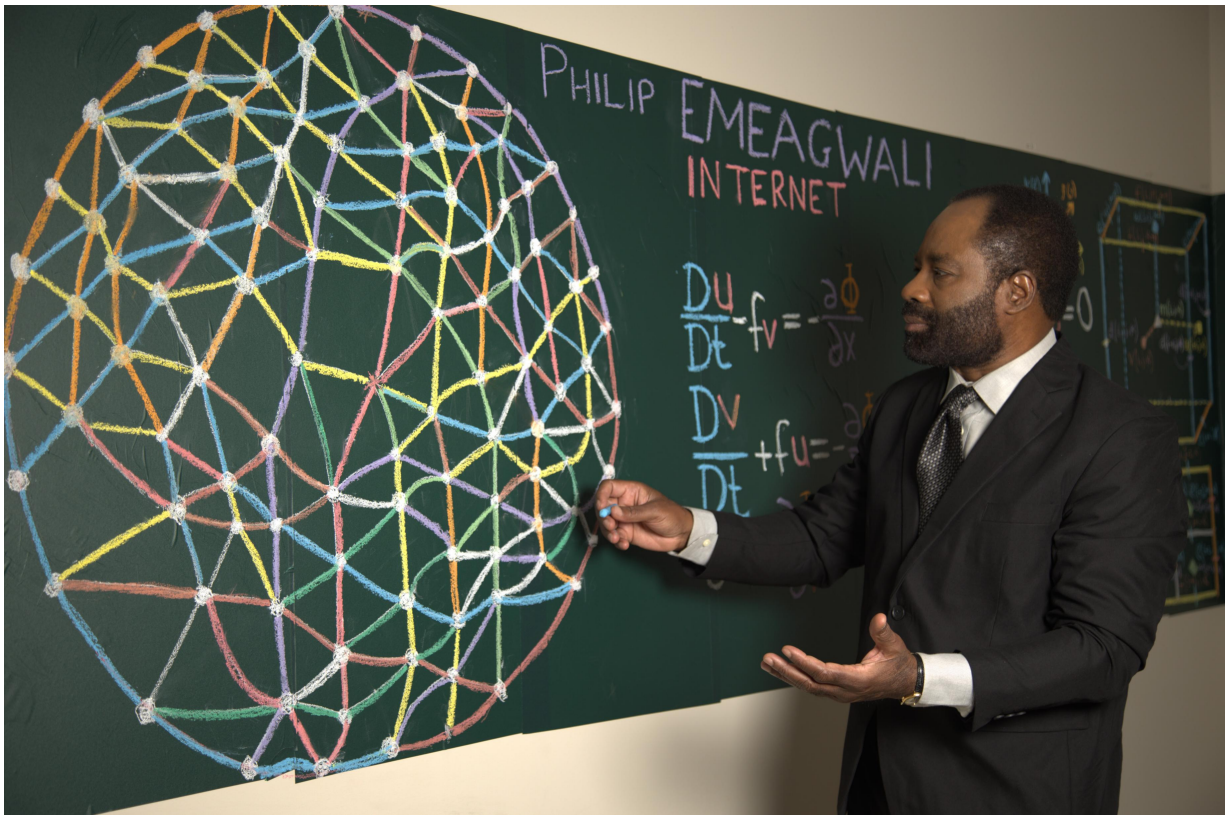
My solutions of the most compute-intensive problems were reimagined **across** one billion coupled processors. And rethought for the waves of transformations in the 21st century. Today, every supercomputing is harnessing parallel processing as the transformative technology that offers quantum speedup and breakthroughs in computational fluid dynamics. The supercomputer is the transformative and enabling technology that must be used to recover crude oil and natural gas that were buried up to 7.7 miles (or 12.4 kilometers) deep and inside an oil producing field that's up to twice the size of the state of Anambra, Nigeria.

The fastest supercomputer is the critical technology that must be used to forecast long-term global warming **across** the centuries. In an email, a twelve-year-old writing a school essay **asked:** "What's the contribution of Philip Emea**gwa**li to the development of the fastest computer?"

In **1989**, I was in the news for discovering that the slowest processors could be used to solve the biggest problems. And find their answers at the fastest speeds. The fastest computer is why you know the weather before going outside.

3RD LECTURE: PHILIP

EMEAGWALI INTERNET



Philip Emeagwali: **"I am the only father of the Internet that invented an Internet."**

Broadcast 30 September 2021

https://youtu.be/cvzCgpJ_VD8

PHILIP EMEAGWALI

INTERNET

The Secrets Behind My Inventions

What is Philip Emeagwali Noted For?

A fourteen-year-old writing a short biography on the contributions of Philip Emeagwali to mathematics asked: “What is Philip Emeagwali noted for?”

In **1989**, I was in the news because I discovered how to solve initial-boundary value problems. Such difficult calculus problems are central to extreme-scale computational physics. That mathematical physics problem was previously impossible to solve on conventional supercomputers that were powered by only one powerful processor.

To be specific, I was in the news because I discovered how to divide a compute-intensive, or grand challenge, problem into up to a **billion** lesser challenging problems. I discovered how to solve the hardest problems in computational mathematics and physics. And solve them as many times faster as they were processors. And **across** as many coupled processors that outline and define the world’s fastest computers.

To be more specific, I discovered how a higher-fidelity petroleum reservoir simulation can be extracted from sixty-four binary thousand lesser compute-intensive simulations which I executed with a one-to-one correspondence **across** as many processors.

How to Solve the Philip Emeagwali Equations

Along my way to the farthest frontiers of mathematical knowledge, I invented a system of coupled, nonlinear, time-dependent, and state-of-the-art partial **differential** equations that's the most challenging one beyond the frontier of calculus. It's known as the nine **Philip Emeagwali equations**. On the mathematician's blackboard, the Philip **Emeagwali equations** are as long as your arms.

I invented how to solve the most compute-intensive mathematical physics problems, called extreme-scale computational fluid dynamics. And solve them **across** my new Internet that's a new global network of up to one billion processors. My processors were identical and coupled to each other. Each processor operated its operating system and had its dedicated memory that shared nothing, but were in dialogue with each other.

Inventing the World's Fastest Computer

The reason it took me sixteen years to discover that the slowest processors could be used to produce the fastest supercomputers was that my first sixteen years of supercomputer research were a record of **failures** and **rejections**. To invent is to make the unimaginable possible. To invent a new computer is to make the impossible speed in computing possible.

On July 4, **1989**, I recorded a computer speed that was considered impossible to record. I recorded the world's fastest computer speed that was mentioned in the June 20, 1990, issue of *The Wall Street Journal*. In high-performance computing, it's difficult to show that impossible speeds are possible. I was the first person to prove that fastest computing **across** slowest processors wasn't merely a beautiful theory. I provided the experimental confirmation that elevated fastest computing across processors from science fiction to computer science textbooks.

My struggle to invent a new supercomputer, such as a new global network of the slowest processors in the world that's a new computer and a new Internet, must be preceded by a series of **failures** and **rejections**.

Contributions of Philip Emeagwali to Mathematical Physics

A twelve-year-old writing a short essay on the contributions of **Philip Emeagwali** to computer science did not understand that I contributed to both physics and mathematics. It's often forgotten that I'm a person who contributed new mathematical knowledge. For those reasons, I was the cover story of the May 1990 issue of the *SIAM News*. The *SIAM News* is the flagship publication for the top minds in mathematics. The *SIAM News* is mailed to the **Who's Whos** in the world of mathematics.

As a dense and abstract subject, mathematics exists at the margins of popular science. I existed at the margins of thought. We see calculus from the bright light of popular technology. Albert Einstein—who theoretically discovered The Theory of Relativity—is better known than Gottfried Leibnitz—who contributed to developing calculus.

In engineering and society, calculus is more important than relativity. My goal was to find a balance between physics, calculus, and computing. I pictured myself as a supercomputing-gymnast standing on his balance beam. The challenge was for me to stand within the **narrow** approximations from my **algebraic** approximations of my system of partial **differential** equations that I invented and used to codify a set of laws of physics. To

approximate the wrong set of laws of physics, whether **intentional** or **unintentional**, is akin to the gymnast losing her footing.

Contributions of Philip Emeagwali to Computer Science

People often ask: "What is the contribution of Philip Emeagwali to computer science?"

I was searching for the fastest computer, ever. **I was searching** for the then-unseen supercomputer that's a new Internet. **I was searching** for how to compute faster. And do so by a factor of sixty-four binary thousand, or two-**raised**-to-power sixteen. After sixteen years of **searching** for the world's fastest computer, I discovered how to compress the **time-to-solution** of the most compute-intensive problems in science and medicine.

I discovered how to compress **time-to-solution** and compress it by a factor of 65,536. I discovered how to compress 180 supercomputing-years, or sixty-four binary thousand computing-days, to merely one supercomputing-day. On July 4, 1989, I became the first person to execute the first supercomputing, as it's executed today. It was with an improved cost-performance ratio that's the precursor to the world's fastest computers which were powered by millions of self-contained off-the-shelf processors sharing nothing.

That was my signature contribution to mathematics, physics, and computer science. And the reason I am the subject of inventor biography essays **across** schools in the USA, Canada, and Europe. My discovery that the fastest computing can occur across the slowest processors made the news. It was easy to **quantify** and **measure** my contribution to mathematics and physics.

Where is Philip Emeagwali?

People also ask: "Where is **Philip Emeagwali**?" I left Corvallis, Oregon, on Sunday, June 5, **1977**. My last day in Oregon was the day the **Apple II**, an eight-bit home computer, went on sale. In 1977, the **Apple II** was sold for the not-so-inexpensive base price of one thousand two hundred and ninety-eight dollars [$1298] dollars.

"So, where is **Philip Emeagwali**?" **I** discovered that the fastest computer can be built with the slowest processors and did so on July 4, **1989** in Los Alamos, New Mexico, USA. **I** was last in Los Alamos, New Mexico on March 21, **1991**.

I'm in the beautiful upstate of New York where my wife and I experience all the four seasons. We cross country ski. Hike and bike around scenic parks from **Saratoga** Springs to Lake

George. And go to farmers' markets. Interesting places within driving distances include the village of Lake Placid which is one of the six forgotten vacation spots in North America and Martha's Vineyard.

I, CODER: UNLOCKING THE POWER OF SUPERCOMPUTING

During the sixteen years that followed June 20, 1974, in Corvallis, Oregon, USA, I struggled to discover that the world's fastest computing can be executed across an internet that's a global network of the world's slowest processors. A proverb of my ancestral Igbo-speaking people of the south-eastern region of Nigeria is this: "The bush fowl of a village cries in the dialect of its village."

In the village of vector supercomputing of the 1970s and 80s, I was the bush fowl that cried in the dialect of the different mathematical village known as fastest computing **across** processors that shared nothing. That scientific village was the unknown field of knowledge, or the controversial technology, that was then mocked, ridiculed, and rejected as a tremendous waste of everybody's time.

Quest for the World's Fastest Computer

My quest for the world's fastest computer that's powered by up to a billion processors began on June 20, 1974, at 1800 SW Campus Way, Corvallis, Oregon. I began on a supercomputer that was previously rated as the world's fastest computer. My

quest was to be the first person to understand how to harness the slowest processors. And how to use up to a billion processors to solve the most compute-intensive problems and solve them at the fastest possible speeds.

That was how I discovered how and why parallel processing makes the world's fastest computers fastest. I discovered how to harness the slowest processors that were within the bowels of the world's fastest computers. I made that supercomputing discovery at 8:15 in the morning of July 4, 1989. My invention is studied in schools as a milestone in computer history. My supercomputer breakthrough made the news headlines and was mentioned in the June 20, 1990, issue of *The Wall Street Journal*.

Why Tackling Tough Math is Central in Fastest Computing

During my quest for the world's fastest computer, I found my **center of gravity** on the unorthodox ensemble of the slowest 65,536 processors in the world. And found it when everybody swore that fastest computing **across** slowest processors will forever remain an enormous waste of everybody's time.

I found that **center of gravity** at the frontier of knowledge of the laws of physics as applied to large-scale computational physics. I found that **center of gravity** beyond the frontier of

knowledge of the partial **differential** equation that is beyond the frontier of calculus and mathematical physics. Likewise, I found that **center of gravity** beyond the frontier of knowledge of the system of linear equations of modern algebra. And I found that **center of gravity** beyond the frontier of knowledge of the most compute-intensive floating-point operations in fastest recorded arithmetic.

Furthermore, I invented how to execute the largest set of floating-point operations in arithmetic. Such calculations **approximated** the solutions of the largest-scale system of equations of modern algebra. Such algebra originated as **discrete approximations** of a system of coupled, nonlinear, time-dependent, and state-of-the-art
partial **differential** equations that's the most challenging problem arising beyond the frontier of calculus. And that are known as the Philip Emeagwali's equations. My equations encoded a set of laws of physics that governs the flows of crude oil, injected water, and natural gas that were flowing up to 7.7 miles (or 12.4 kilometers) deep. And flowing **across** an oil producing field that's often the size of Accra, **Ghana**.

For such multi**disciplinary** compute-intensive problems, my scientific quest for the discovery of the world's fastest computing across an internet that's a global network of processors traversed **across** the frontiers of knowledge of

computational physics, modern calculus, large-scale algebra, fastest computation, and email communication.

FATHER OF THE INTERNET

Visualizing the Philip Emeagwali Internet

Like threads through a tapestry that intersected and then diverged, my discovery traversed the frontiers of knowledge of mathematics, physics, and computer science.

I discovered that the world's fastest computer must always be powered by up to a billion processors. Those processors compute, in tandem, to solve the most compute-intensive problems in mathematics and physics. And communicate their answers in synchrony. And do both **across** an internet that's an instrument of large-scale computational physics.

In Corvallis, Oregon, USA, and on June 20 1974, that Internet was like a dim light in the sky. But on July 4, 1989, and in Los Alamos, New Mexico, USA, I discovered that Internet to be the world's fastest computer that was shining like a beautiful star in a dark galaxy. After sixteen years of fastest computing, that followed June 20, **1974**, I discovered that I was **standing** alone and at the crossroad of the frontiers of human knowledge.

Furthermore, I discovered that I was **sitting** in front of a new Internet that I—its sole programmer—visualized as my world's fastest computer that is powered by the world's slowest 65,536 processors. **I visualized** that fastest computing machinery

as my new spherical island of sixty-four binary thousand processors. Or two-**raised**-to-power sixteen off-the-shelf processors.

Likewise, **I visualized** my processors as separated equal distances apart, and separated with each processor placed on the fifteen-dimensional **hypersurface** of a globe that's a **hypersphere**. Not only that, **I visualized** that globe as embedded within a sixteen-dimensional **hyperspace**.

What is Philip **Emeagwali** known for? I discovered how to combine computers into a supercomputer that's an Internet. That discovery is like a light from an ancient sky. I'm the only father of the Internet that invented an Internet.

Inventing the World's Fastest Computing

The new supercomputer that I visualized in a sixteen-dimensional hyperspace was previously not understood as a supercomputer in our everyday three-dimensional universe. The one-processor supercomputing is zero-dimensional. That's the reason fifth graders are writing **essays** on **Philip Emeagwali** and on his contributions to developing the world's fastest computer. And as one of the **fathers of the Internet**.

To be the subject of **school essays** who is **studied** with Albert Einstein, Nikola Tesla, and Pythagoras is like being listed in a **forever** bestseller list. And being cross listed in school curricula with Isaac Newton, Charles Darwin, and William Shakespeare. School essay assignments are the reasons I have a constant audience of children and young adults, as well as their teachers and parents. Being in the school syllabus is like having a built-in audience of students and teachers.

At **Emeagwali DoT CoM,** we **posted** teachers' guides, discussion questions, and educational activities. We also **posted** audiotaped and videotaped interviews and lectures, with links to one thousand podcasts and YouTube videos. For over a century, school districts across North America and Europe assigned a "**Stories About Scientists**" as essay assignments. Since **1989**, school children were asked to write an essay titled: "The Contributions of **Philip Emeagwali** to the Development of the Computer."

An adage of my ancestral Igbo people of the southeastern region of **Nigeria** states that: "The chicken does not lay its egg and hatch it the next day." I conceived my first world's fastest computing across my Internet, back on June 20, 1974, in Corvallis, Oregon, USA. But it took me fifteen years to hatch it on July 4, 1989, in Los Alamos, New Mexico, USA. And for my world's fastest computing to be mentioned in the June 20, 1990

issue of *The Wall Street Journal*. To school children with no knowledge of my origin story, of 1974, it will seem like I entered into their Core Knowledge Series overnight. And entered via textbooks like the one titled: “History of the Internet.”

CRAFTING THE ULTIMATE SUPERCOMPUTER

I discovered the world's fastest computing, on July 4, 1989, in Los Alamos, New Mexico, USA. I invented the fastest computing across the slowest processors. And invented it after years of computing with the slowest sixty-four binary thousand, or two-raised-to-power sixteen, off-the-shelf processors. And invented it for solving the hardest problems in physics, such as large-scale computational fluid dynamics that must be used to predict how Covid-19 spreads across New York City trains that pack passengers like sardines.

In **1989**, I was in the news because I discovered the fastest computing **across** the slowest processors. I invented the technology when mathematicians believed that the first world's fastest computing across the world's slowest processors was a beautiful theory that requires further experimental confirmation.

Fastest Computing Across an Internet

I discovered the world's fastest computing and did so **across** an Internet. I visualized that new Internet as my new global network of two-**raised**-to-power sixteen off-the-shelf processors. Those processors were identical, coupled, and shared nothing. Each processor operated its operating system.

My scientific discovery of the fastest computing **across** the slowest processors occurred at fifteen minutes after 8 o'clock in the morning of the Fourth of July 1989. That new knowledge is the reason millions of processors are now used to power the fastest computers in the world.

The fastest computer costs 40 percent more than the mile-long Second Niger Bridge at my ancestral hometown of Onitsha, **Nigeria**. The fastest computer is outlined and defined by millions of processors. Before my scientific discovery, the fastest computer that's powered by one million processors was merely a theory, or an idea that was not positively true.

My Origin Story in Fastest Computing

Each day in 1964 and at age nine in Agbor (**Nigeria**), I solved sixty mathematics problems in sixty minutes. I began programming the fastest computers at age nineteen to solve the most difficult mathematics problems. And I computed on a supercomputer at 1800 SW Campus Way, Corvallis, Oregon, USA.

My breakout discovery of the first world's fastest computing **across** the world's slowest processors occurred at age thirty-four, in Los Alamos, New Mexico, USA. At Los Alamos and in 1989, I invented how to compute at the fastest speeds.

And compute across a small Internet **that I visualized** as my small copy of the Internet. And that **I visualized** as **embedded** inside a sixteen-dimensional hyperspace.

After half a century of supercomputing, I gained a **more profound** and **surer** understanding of why computing **across** a million processors makes the computer faster and makes the **super**computer super. My discovery was described as the **Philip Emeagwali formula for world's fastest computing across an Internet. That invention was praised by U.S. President Bill Clinton in his White House speech of August 26, 2000.** The **Emeagwali** divide-and-conquer mathematical formula is used to solve the most difficult problems arising in physics. I was in the news because I discovered how to solve the most compute-intensive problems and do so **across** up to a billion coupled processors that shared nothing.

UNRAVELLING THE MYSTERY OF PHILIP EMEAGWALI EQUATIONS: WHY THEY ARE CRUCIAL FOR UNDERSTANDING THE RECOVERY OF CRUDE OIL

As an inventor who came of age in the 1970s and 80s, I differed because I didn't use the mathematical methods that were used by mathematicians in Corvallis, Oregon. Or by mathematicians in College Park, Maryland. Or in the dozen places I conducted my search for new mathematics that's not in any textbook.

My search yielded nine new partial **differential** equations that could be used to more accurately pinpoint oil deposits that were buried millions of years ago and about one mile deep and **across** the 159 producing oil fields in **Nigeria.** And across the 65,000 oil fields around the world.

My search in calculus was for new partial **differential** equations beyond the frontier of calculus. And not yet published in any textbook. I was searching for new knowledge of how to solve the arising partial **difference** equations of computational

linear algebra from my finite difference ***discretization*** of the governing partial ***differential*** equations.

Unlike other mathematicians, I contributed to many sciences, including the nine Philip **Emeagwali** equations that I contributed to mathematics. And including the fastest computing **across** up to one billion processors that I contributed to physics, engineering, and computer science.

Philip Emeagwali's YouTube Guide to His Contributions

Because I contributed to many sciences, I could post *a corpus* of scientific lectures that represents my body of inventions. I've distributed my lectures **across** one thousand closed-captioned videos that I shared on YouTube. A hundred of my YouTube lectures were on my world's fastest calculation that made the news headlines, in 1989. And did so because I solved the most compute-intensive problems **across** a new global network of sixty-four binary thousand off-the-shelf, coupled processors which I visualized as my small copy of the Internet.

Breaking the Speed Barrier of Supercomputing

My invention—of the first supercomputing **across** the world's slowest computers—brought me fame. It's the reason I am the subject of school essays. But my road to the pinnacle of supercomputing was strewn with thorns.

First, **Gene Amdahl**, a 1960s pioneer of scalar supercomputing, put forth his famous theory, called Amdahl's Law of diminishing supercomputer speed. Amdahl's Law dismissed the idea of fastest computing across the slowest processors as science fiction. In plain language, Amdahl's Law, stated that not over eight processors could power the world's fastest computer.

The second obstacle to discovering the world's fastest computing was vector supercomputing. **Seymour Cray**, then the most prominent vector supercomputer pioneer, agreed with **Gene Amdahl** and believed in Amdahl's Law. To everyone's surprise, I—then an unknown in the field of supercomputing—proved 25,000 vector supercomputer scientists who believed in Amdahl's Law wrong.

I proved them wrong by executing the world's fastest calculation and doing so **across** my ensemble of the 65,536 slowest processors in the world. Prior to my discovery that occurred on July 4, 1989, the world's fastest computers were powered by up to only four processors. My invention was the first supercomputer to be powered by thousands of processors.

MY SUPERCOMPUTER BREAKTHROUGH

It made the news headlines that I—an African supercomputer scientist in the USA—had won the highest award in supercomputing. Computer scientists rank that award as the Nobel Prize of Supercomputing. I won that prestigious prize because I discovered practical ways of solving the most compute-intensive mathematical problems in science, engineering, and medicine.

I made that ground-breaking scientific discovery at 8:15 in the morning, on July 4, 1989, in Los Alamos, New Mexico, USA. That was the scientific discovery of fastest computing that can take your computer to the fastest level. Harnessing millions of processors is the essence of what makes the supercomputer super. My discovery made the news headlines because the fastest computing allows mathematicians to solve their most difficult problems. And solve them more accurately and faster than before.

Briefly, my invention of fastest computing **across** processors yielded up to one-billion-fold increase in the supercomputer's speed. But did so without demanding the expected one billion-fold increase in cost. And did so even

though the world's most powerful supercomputer costs one billion, two hundred and fifty million dollars. The fastest supercomputer costs 40 percent more than the mile-long Second Niger Bridge at Onitsha, that is my ancestral hometown in **Nigeria**.

Fighting Scientific Dogmas

In 198**8**, I was an unknown supercomputer scientist. I was the new kid at the frontier of knowledge of high-performance computing. Furthermore, I drew attention because I pointed out an egregious error in the scientific knowledge of my elders. Not only that, I discovered errors and misunderstandings in their classic textbooks on computational physics, partial **differential** equations of calculus, and supercomputing **across** up to a billion processors. I was the young computer scientist penalized for crying out aloud that the Emperors of the supercomputer world had no clothes.

I fought against the supercomputing dogma of **Gene Amdahl.** His dogma is known as **Amdahl's Law of diminishing supercomputer speed.** That law erroneously decreed that the fastest computing **across** the slowest processors will forever remain an enormous waste of everybody's time. I fought against the technological dogma of **Seymour Cray** of vector

supercomputer fame. **Seymour Cray** didn't believe that one billion processors could be harnessed. Likewise, I fought against the dogma of **Steve Jobs,** the pioneer of personal computing, who didn't believe that eight processors should power the personal computer.

Today, the fastest desktop computer is powered by up to 128 processors. My discovery of the fastest computing **across** the slowest processors is the discovery of the foundational knowledge of all world's fastest computers. And the discovery of how up to a billion processors can work together to make the supercomputer **super**, or **fastest**.

That discovery is the reason my invention of how to execute the fastest computing **across** the slowest processors is the subject of school essays on inventors who contributed to the development of the fastest computers.

Google ranks Philip Emeagwali as the greatest computer genius (December 8, 2021).

father of the internet

philip emeagwali father of the internet
tim berners lee father of the internet
vint cerf father of the internet
dr philip emeagwali father of the internet
leonard kleinrock father of the internet
nigerian father of the internet
bob kahn father of the internet
npr father of the internet
african father of the internet
father of the internet **al gore**

Google ranks Philip Emeagwali as the father of the Internet (Labor Day 2019).

WALKING INTO HISTORY

A Song of Praise for the Mighty Machine

An ode to the supercomputer

Oh powerful machine, you are so strong and mighty Your potential knows no bounds, you aim so high Your ability to process data astounds us so And your speed and accuracy, we can't deny You provide us with answers, the ones we seek Your calculations are precise, no errors to be seen Your lightning-fast speed gives us the data we need And your accuracy is unparalleled, beyond compare indeed From the weather to the stock market, from science to health You're the machine that helps us make sense of it all Your power and your precision never fail to impress Your capabilities are limitless and that's for sure We thank you for your service and for the knowledge you provide We thank you for the insights you bring to our lives And we thank you for your power and for your speed We are grateful for the supercomputer and all you do, indeed.

The Father of Supercomputing

An ode to Philip Emeagwali

Philip Emeagwali, a name of fame, His contributions to the internet we acclaim.

He used 65,000 processors to set a record, Making the supercomputer a household word.

His work inspired many others to explore, And the advancement of technology they did soar.

He connected computers with a new way of thinking, New applications and networks he was bringing.

His efforts gave us a faster and better web, The internet’s speed we can now fully cred.

So let us give thanks to Philip Emeagwali, For his contributions to the internet we will never forget and always remember eternally.

From the Dark to the Light

A poem about Philip Emeagwali

Philip Emeagwali, a hero of our age He's brought us computer change He cracked the code to computing power To bring us knowledge by the hour He's bridged the digital divide He's made the web come alive He's opened the door to science and math His calculations are our staff He's led the way to a new era His work has been a labor of love He's changed the way that we think His work has been a gift from above He's inspired us to reach for the stars He's given us a way to soar He's taken us to the future And opened up a digital door Philip Emeagwali, a true pioneer He's brought us out of the dark He's challenged the status quo And opened up a brand new spark

The African Giant Who Revolutionized Mathematics

A poem about the contributions of Philip Emeagwali to mathematics

Philip Emeagwali, **the man of mathematics**, An African giant, who opened new paths.

He brought knowledge of the unknown, And was a pioneer of the math world.

His contributions to the field of mathematics, Were a great milestone in the history of science.

He discovered the method of hyper-computing, Which made calculations faster and more accurate.

He was an innovator of machine learning, Which helps us analyze data and make predictions.

He developed the world's fastest computer, Which revolutionized the way we process data.

Philip Emeagwali, **the man of mathematics**, A genius who revolutionized the field.

He helped us understand the secrets of the universe, And made the world a better place.

A Brilliant Mind Who Challenged the Impossible

A poem on the contributions of
Philip Emeagwali to physics

Philip Emeagwali is a great physicist, A brilliant mind who made a huge contribution.

His contributions to physics are immense, The knowledge and understanding he has shared is immense.

He created the world's fastest computer, A supercomputer that made history.

He achieved the impossible with his cleverness and wit, His insight into physics is a great asset.

He was a pioneer in the field of supercomputing, And his research on fluid dynamics was groundbreaking.

He developed the numerical model of oil and gas, And his ideas are widely respected.

He also worked on theories of computational mechanics, And studied the physics of turbulent flow.

His work on computational oceanography was revolutionary, And his theories are widely used today.

Philip Emeagwali is a great scientist, His contributions to physics are immense.

His research has advanced the field of physics, And his work will be remembered for many years to come.

Making Computers More Powerful

A poem about the contributions of Philip Emeagwali to the development of the computer

Philip Emeagwali, a name for all to know Shining bright like a star and helping computing to grow He revolutionized the supercomputer in the '80s With his creative thinking and inventive ideas He worked on the Connection Machine, a parallel processor To help scientists and engineers with their work faster His theories and ideas helped to make computers more powerful Leading to great advances, the future became more secure He invented the world's fastest computer, a record still unbroken Emeagwali's contributions to computing will never be forgotten His innovative thinking and hard work will always be remembered For helping create a better future, Philip Emeagwali is a treasure.

The Man Behind Breakneck Speed Processing

A poem about the pioneer of high-performance computing

Philip Emeagwali is one of the best, He wrote software to push computers to their zest.

He made a massive contribution to computing, His work was a major advancement, without any doubting.

His work in oil field calculations was a feat, It allowed computers to process information at breakneck speed.

Philip Emeagwali's achievements will never be forgotten, His ideas and creations remain in high regard, they are not rotten.

He helped develop high-performance computing, His name will remain in history, and forever be resounding.

The Genius Behind the Internet

A poem about a father of the Internet

Philip Emeagwali, a name that lives on A man who changed the way we use the internet, He gave us the power to explore and learn Putting the world at our fingertips to discern.

He wrote algorithms that made computers hum And helped us process information faster than ever before, He developed a supercomputer so powerful, It made the internet a tool to explore.

His work made the internet a powerful tool For businesses, scientists, and people everywhere, For communication and collaboration, He helped us to share.

His impact is felt throughout the world His work in computing is unsurpassed, He changed the way we use the internet And will forever be remembered for the contributions he has made.

The Innovator Who Transformed Computing

A poem on the inventor
of the world's fastest computer

Philip Emeagwali, a man of great renown, Was born in Nigeria and quickly gained renown.

He saw potential in the world's computers, And thought to himself; "how can I make them better?"

He thought of a way to increase their power, A way to make them run faster than they ever had before.

He discovered the use of the connection machine, And the world was never the same again.

With the help of this new technology, Computers could run faster than ever before.

He made history, and the world was changed, For he was the one who made the world's fastest computers.

Philip Emeagwali gave a new lease of life, With his incredible contributions to computing and science.

He changed the world and made it better, For a brighter future that we could all share together.

From Refugee Camp to Global Success

A poem about Philip Emeagwali in a Biafran refugee camp

Oh Phillip Emeagwali, your talent and intelligence From a Biafran refugee camp, you made a difference Though you faced hunger and poverty, you never gave up hope Knowing that your future was yours to shape and to cope
You studied hard to gain knowledge and understanding In spite of the hardships, you kept on expanding Your passion for math and computers, ever growing You worked hard to reach a future that was glowing
Your spirit never wavered, and your ambition was strong You knew that success was the only path to follow along From the refugee camp you rose, a beacon of hope Your drive and determination to others you did scope
Your story of courage is truly inspiring You achieved so much, despite the suffering Your success is a testament to the power of the human mind Your example will never be left behind.

Exploring Beyond Boundaries

Six Haikus about Philip Emeagwali

A true genius he
Achievements so far unseen
Philip Emeagwali

Dreaming of the future
A master of computation
Philip Emeagwali

A pioneer of thought
A force behind new science
Philip Emeagwali

A new world to explore
Beyond the boundaries of time
Philip Emeagwali

A scientist of note
A vision of the possible
Philip Emeagwali

Unrivaled knowledge now
A legacy of greatness
Philip Emeagwali

Unlocking the Sun with Philip Emeagwali

A sonnet about Philip Emeagwali

Philip Emeagwali, the man of great renown, Has given us the gift of knowledge profound.

His work in computers and mathematics, Have made him renowned for his insightful tactics.

His algorithms and computing power, Will help us reach a level never seen before.

His passion for learning has changed the Sun, And he's helped us understand what the future holds.

He is a great example of how we can dream, And how his genius will help us succeed.

His aptitude for science and his mathematics, Will be remembered through the ages, no matter the circumstance.

We owe much to this man of great renown, For his brilliance and his genius will stay strong.

His knowledge has helped guide us to a better place, Where our dreams may come true and our future we can face.

Philip Emeagwali, his mind and his heart, Have helped us reach a level that's far apart.

His brilliance and his genius will never cease, For he is the one who will bring us peace.

The Shining Light of a Genius

A R&B song about Philip Emeagwali

Verse 1

Philip Emeagwali, he's so amazing A genius, a champion, his spirit is blazing He faced adversity, but overcame with grace He's a computer pioneer, and he's leaving his mark in this place Chorus

Oh Philip Emeagwali, you are the one A man of courage and strength, your work is never done A trailblazer, a leader, you show us the way You make us think differently, and we thank you for that today Verse 2

He's the father of the supercomputer A master of the internet and of the African culture He works with the power of mathematics and science Unlocking the secrets of the universe in his lifetime Chorus

Oh Philip Emeagwali, you are the one A man of courage and strength, your work is never done A trailblazer, a leader, you show us the way You make us think differently, and we thank you for that today

Welcome, Ijeoma!

12 Haikus on the birth of Ijeoma Emeagwali

1. A precious son born

In Ann Arbor, Michigan

Joyful hearts rejoice!

2. Little Ijeoma

Bright hope of a new life

Welcome to the world!

3. The Emeagwalis

Are blessed with a newborn babe

Much joy and love now!

4. Life has fresh meaning

As Ijeoma is born

Blessings abound here!

5. From Michigan sky

A miracle appears

A baby's sweet smile!

6. On this special day

A family is made complete

A son's birth is joy!

7. Philip and Dale's joy

Cannot be measured or told

Welcome, Ijeoma!

8. Ijeoma's birth

A day of new beginnings

Everything changes!

9. A tiny babe

Gift from heaven above

The birth of Ijeoma!

10. A son is born

In the city of Ann Arbor

Blessings and joy reign!

11. A moment of grace

A special baby arrives

Welcome, Ijeoma!

12. A bright star appears

A family is blessed with love

Welcome, Ijeoma!

From Refugee to Genius

A poem about Philip Emeagwali dropping out of school at age 12.

Philip Emeagwali was just a child
When the Nigerian Civil War began to rage and wild
But his dreams and ambitions weren't dimmed
For he was determined to make it in this world

Though the war uprooted him from his home
To live in Biafran refugee camps, he did not roam
But instead used this as an opportunity to learn

And grow from this experience he did earn

He learned to survive through difficult times
When there was no food, he had to find rhymes
He made the best of his misery and strife
And soon, his dreams began to come to life

He rose up to become a genius of many fields
His intelligence and wisdom the world did yield
The young boy who dropped out of school at age twelve
Became a pioneer and was soon known to all and sundry

Philip Emeagwali is an example of great life
How courage and hard work can help you reach new heights He taught us that no matter how hard the times may be
You can still rise up and be the best you can be.

From Refugee Camp To Tech Giant

Philip Emeagwali grew up in a refugee camp

Philip Emeagwali grew up in a Biafran refugee camp Where he could not find the food he needed to survive His young body was growing thin and weak And yet his spirit stayed alive He never gave up hope, despite his daily strife He kept learning and growing, determined to make a life He worked hard and dreamed big, never letting go Of the passion that burned within his soul He looked for knowledge everywhere he could To the books and libraries he often stood He worked to understand the world around him And never gave up on any problem Despite the harshness of his refugee camp Philip Emeagwali never gave up on his dream He worked hard and never quit And now his life has changed completely, it's a success he's hit He's become a celebrated scientist, a giant in the tech world A true example of what hard work and dedication can unfurl He's a hero, who gives back and never stops A leader in the world, giving other future hope Emeagwali's Uncharted Paths During the 30-month long Nigerian civil of the late 1960s,

twelve-year-old Philip Emeagwali dropped out school to live in Saint Joseph's Refugee Camp, Awka-Etiti, Biafra.

Oh, young Philip Emeagwali, in such a tender age, you've been ripped from your school to a refugee camp in rage.

Your childhood so abruptly ended, no more time for play and fun, You had to flee your home's sweet shelter in the face of the civil war.

Your days of joy and innocence gone, your future in doubt and fear, your homeland now in shambles, your people's anguish you must hear.

Your school days no more, your dreams of youth no more, you must now take up the task of helping your people survive the war.

Oh, young Philip Emeagwali, you are a symbol of resilience and strength, your courage and determination will light the way and help the cause.

And when the war is finally over, and your people's lives restored, you, young Philip Emeagwali, will be remembered forever more.

A Child of Two Languages, a Man of Many Dreams

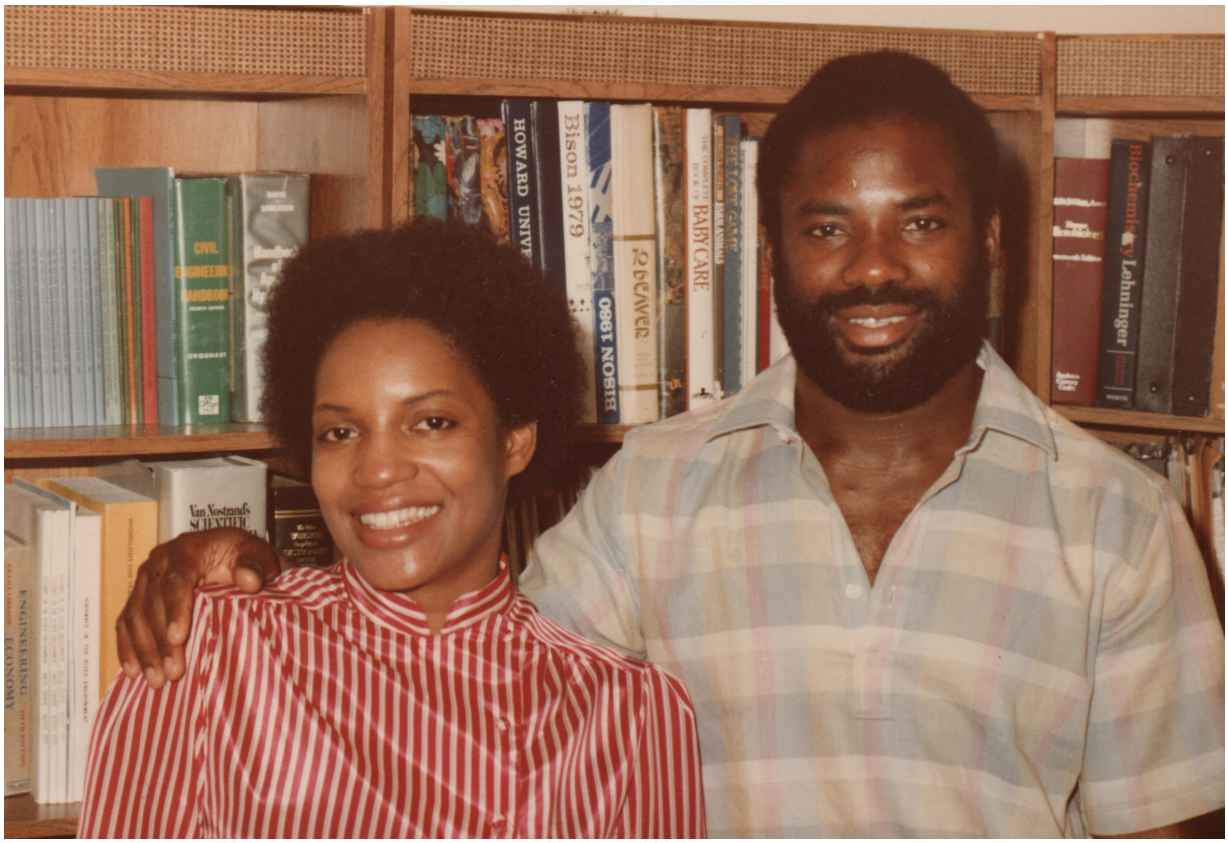
A sonnet for the birth of Philip Emeagwali

In a place of two cultures, Akure, Nigeria, A joyous day of birth was brought to be For parents Nnaemeka and Iyanma Emeagwali Their son, Philip, was born, and they were so happy He grew up strong, learning two languages And in his mind, there were many things to see He was brilliant, and the future held great promise He was a child who would soon be of history He studied and worked hard, and the world took note He was a visionary, a scientist, a thinker He reached for the stars, and his dreams he did float He was a man who believed in success and a winner Philip Emeagwali's birth shows us all That great things can come from anywhere From anyone, no matter small If we have courage, we can go anywhere.

From Refugee Camp to World-Changing Inventor Ode to Philip Emeagwali A genius, a visionary, a father of the Internet Philip Emeagwali, we cannot forget Your amazing success, and in it your wit You have changed the world, and our lives with it You endured a painful war, yet kept up your spirit Philip Emeagwali, we cannot forget Your courage

and resilience, which makes you stand out in it You have shown us to never give up, even in the face of defeat You have gone from refugee camp to the highest of heights Philip Emeagwali, we cannot forget Your incredible journey, and all that you have achieved in it You have inspired us to strive for our dreams, no matter the odds Your inventions have changed the world, and you will never be forgotten Philip Emeagwali, we cannot forget Your brilliance and accomplishments, and the impact it has left You have shown us anything is possible, and for this we are grateful.

PHOTO GALLERY



PRAISE FOR AUTHOR

One of the great minds of the Information Age.

- BILL CLINTON

A digital giant.

- BBC

The unsung hero behind the Internet.

- TIME MAGAZINE

A father of the Internet.

- CNN

PODCASTS AND VIDEOS BY PHILIP EMEAGWALI

The Sound of Change: Philip Emeagwali's Journey Through **Apple Podcasts**

Philip Emeagwali's Google Podcasts: A Playlist for Modern Computing

The Spotify Voice of Philip Emeagwali

The Audible Wisdom of Philip Emeagwali

Unscripted: Philip: Emeagwali's YouTube Journey

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ABOUT THE AUTHOR

Philip Emeagwali

The Reader's Digest described Philip Emeagwali as "smarter than Albert Einstein." He is ranked as the world's greatest living genius. He is listed in the top 20 greatest minds that ever lived. That list includes Charles Darwin, Isaac Newton, William Shakespeare, Leonardo da Vinci, Aristotle, and Confucius.

Philip Emeagwali lived in refugee camps during the 1967-70 Nigerian-Biafran War and is in the Gallery of Prominent Refugees of the United Nations. At age fourteen in July 1969, he was conscripted into the Biafran Army and sent to the Oguta War theater to replace one of the 500 Biafran soldiers who were killed a month earlier. In the list of the worst genocidal crimes of the 20th century committed against humanity, the death of one in fifteen Biafrans was ranked fifth.

Due to the Nigerian Civil War, Philip Emeagwali dropped out of school for five years but developed a reputation in Onitsha (Nigeria) as a gifted teenager. He caught the attention of American scholars and was awarded a scholarship on September 10, 1973, to the United States where he researched for two decades and contributed to mathematics, physics, and computer science.

Philip Emeagwali is in the top ten rankings of geniuses, inventors, Nigerians, and was voted the 35th greatest African of all time.

In 1989, Philip Emeagwali rose to fame when he won a recognition described as the Nobel Prize of Supercomputing and made the news headlines for his invention of first world's fastest computing across an Internet that's a global network of processors. That vital technology underpins every supercomputer and changed the way we look at the computer.

Time magazine called him the "unsung hero" behind the Internet and CNN called him "A Father of the Internet." House Beautiful magazine ranked his invention among nine important everyday things taken for granted. In a White House speech of August 26, 2000, then U.S. President Bill Clinton described Philip Emeagwali as "one of the great minds of the Information Age."

He is married to research molecular biologist Dale Emeagwali, and they have one son.