35 Father of the Internet

https://soundcloud.com/emeagwali/how-i-invented-the-modern-supercomputer-and-how-i-discovered-parallel-processing-episode-170118

https://www.youtube.com/watch?v=nFC097kP6WE&index=9&list=PLEkGuecg78B_w4pvRmQjv8gnvTqgQ_W35&t=2342s

Philip Emeagwali Lecture 180606-2
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My experimental discovery
of the massively parallel processing

supercomputer
opened the path
to the modern supercomputer
that computes in parallel.
I experimentally discovered
the modern supercomputer
and I did so
on the Fourth of July 1989
in Los Alamos, New Mexico,
United States.
In 1989, I won the top prize
in the field of supercomputing
and I won it for my contribution
to the massively parallel processing
supercomputer.
I won that top supercomputer prize
for confirming a speed increase of
a factor of 65,536.
I confirmed that speed up
through new experiments
that I conducted **across**

my new internet
that is a new global network of
65,536 tightly-coupled processors
with each processor
operating its own operating system
and with each processor
having its own dedicated memory
that shared nothing with each other.
In 1989 and onwards,
I was in the news
for experimentally discovering
the massively parallel processing
supercomputer.
I was in the news
for inventing the technology **across**
a new internet
that is a new global network of
processors
that is a new supercomputer
that is a new computer.

Since 1989, I've been the subject
of school reports
written on my contributions
to the development of the
modern supercomputer
that computes
by massively parallel processing
across a new internet.
I visualized that new internet
as a new supercomputer
and as a new global network of
65,536 tightly-coupled processors
that were commonly available.
I visualized my new supercomputer
as powered by 64 binary thousand
processors
that shared nothing with each other
but, yet, as *de facto* supercomputing
with only one unified and cohesive,
giant processor.
My sending and receiving

of 64 binary thousand emails
that occurred synchronously
on the Fourth of July 1989
was completely unexpected.
I experimentally discovered
a new supercomputer
that yielded unexpected speeds
and speedups.
My new supercomputer
could be seen
but it could not be understood.
My new supercomputer
could be felt
but it could not be accepted.
I experimentally discovered
how my new supercomputer
was backward-compatible
with your computer,
and backward-compatible
the way this year's
computer operating system

is backward-compatible
with last year's computer
operating system.
That massively parallel processing
supercomputing
that was executed
across an ensemble of
65,536 tightly-coupled processors
that were already available
in the market
was the experimental discovery
that pushed the limits
of the modern supercomputer.
Massively parallel processing
created the technological foundation
for the limitless inventions
that disrupted
the supercomputer industry
and made the vector processing
supercomputer technology obsolete.

The June 20, 1990 issue
of the *Wall Street Journal*,
and other print media
reported that—I, **Philip Emeagwali**—
had experimentally discovered
how a new internet
that is a new global network of
65,536 tightly-coupled processors
that were already available in the market
that is **wired together**
by another global network of
1,048,576 regular, short, and equidistant
email wires
could be programmed
to solve the toughest problems
in extreme-scale computational physics
and programmed to compute **faster than**
any vector processing supercomputer.
That new supercomputer
that was a new internet
and that I programmed in the 1980s

is the **pre-cursor**
to the modern supercomputer
that is powered by up to
ten million
six hundred and forty-nine thousand
six hundred [10,649,600]
processors
that were already available
in the market anyway.

35.1.1 Philip Emeagwali Supercomputer is an Internet

After my experimental discovery
of the Fourth of July 1989,
the fastest computations were recorded
across an **ensemble** of about
sixty-four binary thousand
processors
that were already available

in the market anyway.
Each processor was akin
to a tiny computer.
My 64 binary thousand
already-available processors
were wired together
by one binary million
regular, short, and equidistant email
wires
and were wired together
as an **inconspicuous** internet
that I discovered
was a new global network of
already-available processors
that were married together
by regular and short email wires
that were equal distances **apart**
and that enshrouded a globe
in the sixteenth dimension.
On the Fourth of July 1989

and in Los Alamos, New Mexico,
United States,
I experimentally discovered
how to execute the fastest computations
and how to use those computations
to solve the toughest problems
arising in extreme-scale
computational physics
and computational mathematics.
I mathematically discovered
how to solve
initial-boundary value problems
of modern calculus
and how to solve them
across plentiful, powerful, and
inexpensive processors
that were mass marketed
for the computer industry
and that were married together
as one seamless, cohesive supercomputer

and married together
by a new global network of
one binary million
regular and short email wires
that were equal distances
apart.
That new global network of processors
became the **new** heartbeat
of a **new** internet
that's a **new** supercomputer.
My supercomputer invention
that occurred on the Fourth of July 1989
got a lot of media attention
in nineteen eighty-nine [1989]
and continued to get attention
in the nineteen-nineties [1990s]
and beyond.
As reported in the June 20, 1990 issue
of *The Wall Street Journal*,
my invention

of the massively parallel processing
supercomputer
was not in the new fastest
supercomputer.
My **invention**
was in inventing
a new way of thinking about
the new fastest supercomputer
and thinking about the supercomputer
of tomorrow
not as a computer *per se*
but as a new global network of
processors
that is a new internet *de facto*.
My **invention**
of the massively parallel processing
supercomputer
was independent of processor technology
and was a blueprint for a new internet.
In the year nineteen eighty-nine [1989],

it made the news headlines
in major U.S. newspapers
that I—**Philip Emeagwali**—
conducted new, unorthodox email
experiments.
My quest in those email experiments
was for the fastest speeds
in supercomputing
that I could achieve via email
and record **across**
a new global network of the slowest
64 binary thousand
tightly-coupled processors.
The **experimental discovery**
that I recorded
from those email experiments
of the Fourth of July 1989
provided the designers
of the modern supercomputer
with the insight and the knowledge

that massively parallel processing
is a technology
that compresses the **time-to-solution**
of extreme-scale problems
arising in computational physics
and computational mathematics
and compresses that **time-to-solution**
from **30,000** years to just one day.
My supercomputer speedup
—of from **one day** to **180** years—
made the news headlines
in newspapers across the world.
My invention
made the headlines because
it was quantum and paradigm shifting,
instead of incremental and evolutionary.
With that supercomputer speedup,
the cost-benefit ratio
of the old vector processing
supercomputer

of the 1970s and ‘80s
fell by a factor of a thousand
and fell when compared
to the performance of the new
massively parallel processing
supercomputer
of the 1990s and later
that is solving
the same grand challenge problem
that arises in computational physics.
A world without the massively
parallel processing supercomputer
is a world
in which the extreme-scaled
computational physicist is asked:
“Is there a change in climate?”
and getting the computational physicist’s
answer 30,000 years later.
That new knowledge
of the massively parallel processing

supercomputer
that I **invented**
changed the way
we look at the modern supercomputer.
In my email supercomputer experiments
of the 1980s,
I used the metaphor
that sixty-five thousand
five hundred and thirty-six [65,536]
chickens
that were plowing a field,
represent as many weak processors
solving the toughest problems
in extreme-scale computational physics.
In my invention
of the massively parallel processing
supercomputer
that occurred
on Independence Day 1989,
each processor

computed with the speed of
forty-seven thousand
three hundred and three [47,303]
calculations per second.
I experimentally discovered
that sixty-five thousand
five hundred and thirty-six [65,536]
chickens, or as many slow processors
were, **in totality**,
faster than one strong oxen,
or the fastest sequential processing
supercomputer,
plowing the same field,
or executing
the same excruciatingly-detailed
simulations
arising in extreme-scaled
computational physics
and modern calculus.
My invention

of the massively parallel processing
supercomputer
was a **David** versus **Goliath** battle,
in which, **David**, or the chicken,
could only perform the extremely slow
47,303
calculations per second
per scalar processor
and **Goliath**, the oxen
or the supercomputer, could perform
the extremely fast
one billion calculations per second
per vector processor.
That strong oxen
was my metaphor for one
vector processing supercomputer
solving the same computation-intensive
problem.
With that invention,
parallel processing

the technology that was dismissed
as a huge waste of everybody's time
became a technological gold mine.
After my invention,
supercomputer designers
paradigm shifted
from designing
the vector processing supercomputer
that computes
with only one isolated electronic brain
to designing the unorthodox
massively parallel processing
supercomputer
that now computes with up to
ten million
six hundred and forty-nine thousand
six hundred [10,649,600] processors.
I theoretically and experimentally
invented
how to increase the speed

of a new massively parallel processing
supercomputer
that's a new global network of
64 binary thousand
already-available processors
that shared nothing with each other
that's a new internet,
de facto.

35.1.2 Rich Consequences For Africa

In my increased parallel processed
speedup,
the fastest computers in the world,
or a supercomputer,
will be more than sixty-five thousand
five hundred and thirty-six [65,536]
times faster
than your personal computer.
Fastest supercomputing

is a big budget, a high-risk,
and a high-payoff research.
The fastest supercomputer
costs the budget of a small nation
but it pays off
because it's the critical technology
that must be used
to discover otherwise **elusive**
crude oil and natural gas in Uganda,
East Africa.
The massively parallel processing
supercomputer
is used to recover otherwise **elusive**
crude oil and natural gas
in Niger Delta region of
southeastern Nigeria,
West Africa.

35.1.3 Fertile Consequences for the Computing Industry

My **invention**
of how and why
massively parallel processing
makes the modern supercomputer
the fastest
opened doors in extreme-scaled,
excruciatingly-detailed simulations
within a multi-disciplinary environment
arising in computational physics.
That invention opened doors
in supercomputing industries, such as
scalable, high-resolution
petroleum reservoir simulations,
extreme-scaled
computational aerodynamics,
and **excruciatingly-detailed**
climate models.
In the 1980s,

searching for the technology
of the massively parallel processing
supercomputer
that has **permeated**
into the modern computer of today
was like searching for
a **black goat at night.**
Back in the 1980s, I theorized
and visualized
the fastest computation
that I **invented**
as occurring
via emailed computer codes
that I sent to and received from
sixteen-bit long email addresses.
I theorized and visualized
my fastest supercomputer
as massively **parallel processing**
and doing so in a universe
with sixteen spatial directions
that are mutually orthogonal.

Back in the 1980s,
I was the only full-time programmer
of the only massively
parallel processing machine
powered by
the slowest 64 binary thousand
processors that were already available in
the market
that I visualized as outlining
a small internet.
For me, **Philip Emeagwali**,
to massively parallel compute
and to communicate
across that then unimagined
new internet
and to massively parallel compute
as a lone wolf,
in Los Alamos, New Mexico,
United States,
was a very visceral journey
to the then unknown world

of the known
modern supercomputer of today.
In the 1980s, the massively
parallel processing supercomputer
of today
was a *terra incognita*
where science fiction became
non-fiction.
And to massively parallel process
was akin to embarking
on a visceral journey.
For me, that visceral journey
was through the most abstract calculus,
through the most large-scale
algebraic computations,
and through
the most computation-intensive
floating-point arithmetical operations
ever executed on any supercomputer.
On the Fourth of July 1989,
I invented

how to control
and how to program
each of my 64 binary thousand
processors
that were already available
in the market anyway.
I invented
how to program processors
and how to do so via emails
that I sent to and received from
the sixteen-bit long email addresses
of my two-raised-to-power sixteen,
or the 64 binary thousand,
processors that were already available in
the market
that defined and outlined
my new internet.
My **invention**
of the massively parallel processing
supercomputer
was in my air during the sixteen years

—onward of June 20, 1974.
I programmed
sequential processing supercomputers,
vector processing supercomputers,
and parallel processing supercomputers
and program them
during those sixteen years.
In those sixteen years,
I programmed supercomputers
and I did so as a lone wolf
supercomputer scientist
that was often alone
and at the **farthest frontier**
of the modern supercomputer.
Contrary to the widely held belief,
the core of my scientific thinking
was not done in government
or academic laboratories.
As a black research
supercomputer scientist,
the core of my scientific thinking

had to be done in my living room
and in my walk-in closet that I converted
into a laboratory
for remotely programming
far-away supercomputers
in places like Corvallis (Oregon),
Chicago (Illinois),
Boston (Massachusetts),
and Los Alamos (New Mexico,
United States).
After sixteen years of supercomputing,
it made the news headlines
that an African supercomputer wizard
in the United States
had invented
how to execute the world's
fastest calculations.
I—**Philip Emeagwali**—is that African
supercomputer scientist
who was in the news back in 1989
and who invented

how to compute **across**
the most massively parallel processing
supercomputer
ever constructed.
I visualized my fastest calculations
across my new internet
before I **invented**
the fastest calculations
across my new global network of
64 binary thousand
processors that were already available in
the market,
or **across** as many tiny, identical
computers.
I visualized my new internet
in a fictional sixteen-dimensional
universe
but I invented
my new supercomputer
in our factual three-dimensional
universe.

My scientific journey
into the *terra incognita*,
or the unknown world,
of abstract calculus
and extreme-scale algebra
led me into the **uncharted territory**
of supercomputing **across**
my new internet
that is a new global network of
processors that were already available in
the market anyway.
That scientific journey
led me to the **invention**
in extreme-scaled
and **excruciatingly-detailed**
computational physics
that the modern supercomputer scientist
now use to gain a surer and deeper
understanding our physical world.
That **invention**
of the massively parallel processing

supercomputer
has commercial applications
in healthcare, telecom, financial services,
culture, and entertainment.
That **invention**
of the fastest computation
had rich and fertile consequences
and gave rise to the critical
and the enabling technology,
that is now described as the
modern supercomputer.
That **invention**
of the fastest supercomputer
attracted media attention because
it was a scientific discovery
that pushed the boundary
of human knowledge
of the most extreme-scale computations
arising in the fields of mathematics,
physics, chemistry, medicine, and
engineering.

35.1.4 Contributions of Philip Emeagwali to the Development of the Computer

Science is the body of knowledge
of the universe.
Science is based on facts and truths
that can be reproduced
through experiments and observations.
The invention
of how to compute faster
by parallel processing **across**
a new internet
makes the world
a more knowledgeable place
and a better place.
The invention
of a faster supercomputer
is a historical milestone

that measures human progress.
The reason my invention
of how to compute faster
—and how to do so
by changing the way we look at
the modern supercomputer—
is a marker of progress
is that it's a discovery
that makes the **impossible-to-compute**
possible-to-compute.
The invention
of the massively parallel processing
supercomputer
proves that humanity is progressing
in the right direction.
Each discovery of a faster computer
increases our level of civilization
and enables our children
to do better than us.
The greatest achievement
of humanity is the achievement

of modern computer science and
technology.
The greatest achievement
of information technology
is the invention
that gave rise to
the global network of computers
that is a new internet.
I described my **invention**
as my experience of seeing
the **precursor** to the modern
supercomputer.
That **precursor** was a new internet
that was previously unseen
by any supercomputer scientist.
And the previously unseen internet
that I saw first
was a global network of
sixty-four binary thousand
already-available
processors

that were **married together**
by one binary million
regular, short, and equidistant
email wires
that emulates one
massively parallel processing
supercomputer
that is one cohesive whole unit
and that I named a primordial internet
and that I visualized
as **my small copy** of the Internet
and that I used
to **invent**
how and why parallel processing
makes computers **faster**
and makes supercomputers
fastest, namely,
the Philip Emeagwali formula
that President Bill Clinton described
in his speech of August 26, 2000.
That **invention**

is why American school children
are doing school reports
on the contributions of
Philip Emeagwali
to the development of the computer,
the supercomputer, and the internet.
An invention is like a light
at the end of a dark tunnel.
I visualized my inventions
as 65,536, or two-raised-to-power
sixteen,
equidistant points of light
that were evenly distributed **across**
the hypersurface of a hypersphere
in a dark sixteen-dimensional
hyperspace.

35.2 How I Invented an Internet

35.2.1 Father of the Internet

The internet
is a global network of computers
that encircles the Earth.
The father of the Internet
is the inventor
that invented a global network of computers
and/or processors
that encircles a globe.
If the father of the airplane
is the inventor
that flew the first small copy of the airplane,
then the **father of the Internet**
is the inventor
that invented a room-sized copy
of the planetary-sized Internet.
You will know the **father of the Internet**
at a visceral level.
You will know the **father of the Internet**

after watching his presentations
on how he invented
a never-before-seen internet
that is a new
global network of processors
that is a small copy
of the Internet.
For the search phrase:
"**Father of the Internet**,"
the name "**Philip Emeagwali**"
comes up first in top ten
Google autosuggestions.
And as expected, I'm often asked:
"Who's the **father of the Internet**?"
I explained that the Internet
is not an invention, *per se*.
To describe the Internet
as an invention
will be akin to describing
the Pyramid of Giza
in Africa as an invention.

The Pyramid of Giza
is the largest, the oldest,
and the only remaining
of the Seven Wonders
of the ancient world.
Yet, the Pyramid of Giza
is not an invention.
The Pyramid of Giza
was the biggest engineering project
of the ancient world.
The Internet
that **encircles** planet Earth
is the world's biggest engineering project
of all times.
The Internet **encircles** the Earth
with processors, computers,
and fiber optic wires.
The Internet
is a project-in-progress.
It's impossible for one person
to build or invent the entire internet

that **encircled** the Earth.
But it is possible for one inventor
to invent
a room-sized model of the Internet
that is a working prototype
of the Internet
that could be constructively reduced
to the planetary-sized Internet.
In the sixteen years,
onward of June 20, 1974,
I continually said that
I—**Philip Emeagwali**—working alone
invented **a new internet**
that encircled a room-sized globe
that I visualized
as an idealized model
of the Internet
that encircled the Earth.
The internet
has many fathers and mothers,
uncles and aunts.

But I am the only father
of the Internet
that invented a new internet.
I was in news headlines
because I invented
a massively parallel processing
supercomputer
that was the precursor
to the modern supercomputer
that **I visualized** as a new internet.
I visualized my new supercomputer
as a new global network of
sixty-five thousand
five hundred and thirty-six [65,536]
homogenous processors,
or as many identical computers.
I visualized my new supercomputer
as married together
as one cohesive whole unit
and **married** by one million
forty-eight thousand

five hundred and seventy-six [1,048,576]
homogenous, regular, and short
email wires
that are equal distances
apart.
Those two global networks
were the new heartbeat
of the new supercomputer
that I invented
on the Fourth of July 1989
in Los Alamos, New Mexico, United States.
I visualized
my processors that were already
available in the market
as my many identical, tiny computers
that were separated equal distances
apart.
I visualized each processor,
or tiny computer,
that was within my new global network

of 65,536 tightly-coupled processors
as around the Earth
and as three thousand square miles
apart from its
sixteen nearest-neighboring
processors,
or as many tiny computers.
But **I visualized** my commodity email
wires
as uniformly distributed **across**
my new global network of sixteen times
two-raised-to-power sixteen
email wires.
I visualized my commodity email wires
as mutually orthogonal
in sixteen directions
and as **embedded**
into a sixteen-dimensional hyperspace.
The terrestrial internet
—that you call **the Internet**—
is a global network of

heterogeneous computers
that are **married together** as **the Internet**
and married also by
heterogeneous communication wires.
Those **heterogeneous**
processors, or computers,
are different distances **apart**.
For that difference,
my massively parallel processing supercomputer
is a primordial internet
but the terrestrial internet
cannot become a planetary supercomputer.
I visualized that new global network
of communication wires
as an electronic cloth
that encircled the Earth.
I visualized that global cloth
as a planetary super-brain

with a diameter of seven thousand
nine hundred and eighteen [7,918] miles.
Recently,
a 12-year-old wrote to me
and asked:
"I'm doing a school report
on the internet.
Why are you called
the **father of the Internet?**"
I answered:
"I'm called the **father of the Internet**
because I'm the only person
that **invented** a new internet."

35.2.2 Contributions of Philip Emeagwali to the Fastest Supercomputer

Let's look at the speed increase
of the fastest
massively parallel processing

supercomputer
that I invented
on the Fourth of July 1989.
And let's look at that supercomputer
speed increase
and look at it
from the perspective
of the speed increase of the fastest
aircraft.
A test pilot of a supersonic aircraft
that flies at the speed of sound
will travel seven hundred and sixty-eight
[768] miles in an hour.
A bicyclist
travels sixteen [16] miles in an hour.
The pilot
of the supersonic aircraft
is only travelling
forty-seven and half times [47.5] faster
than a bicyclist.
By comparison, I invented

a supercomputer speed increase
of a factor of sixty-five thousand
five hundred and thirty-six [65,536].
I invented
a supercomputer speed increase
that redefined
an ensemble of 64 binary thousand
processors that were already available in
the market
and redefined that ensemble
as a computer that is super.
The supercomputer speed increase
that I invented
is three thousand times greater than
the speed advantage
the commercial aircraft
has over the bicycle.
That was the reason
my invention
of how to compute
64 binary thousand times **faster**

opened a promising line of research
into the commercialization
of the technology of
massively parallel processing
that led to the world's fastest
supercomputer of today
that's powered by
ten million
six hundred and forty-nine thousand
six hundred [10,649,600]
processors that were already available in
the market anyway.
If supercomputer progress is made
along my new line of research,
the next logical step
will be to compute faster
by **paradigm shifting**
into all the **billions upon billions**
of processors
and computers

that will define and outline
the Internet of the next century.

35.2.3 The Rich and Fertile Consequences

The reason my invention
of the massively parallel processing
supercomputer
has rich and fertile consequences
is that the fastest computation
is at the granite core of the computer
and that faster computation
is a milestone and a marker
of the supercomputer inventor's
contributions
to the development of the computer.
The computer was invented
not because
we did not know how to compute.

The computer was invented
because we needed to compute faster,
and sometimes compute infinitely fast.
The partial differential equation
of modern calculus
is defined at infinite points
in space and time.
From that definition,
to solve the partial differential equation
that governs
an initial-boundary value problem,
such as the general circulation model
that must be used
to foresee otherwise unforeseeable
climate changes,
and solve that calculus problem exactly
requires that we compute
at infinitely fast speeds.
Therefore, our children's children
may still need to compute
at infinitely fast speeds

to obtain exact mathematical solutions
to their toughest problems
arising in supercomputing.
In the 1970s, the **vector processing**
supercomputer
was invented to compute faster than
the **sequential processing**
supercomputer.
The June 20, 1990 issue
of *The Wall Street Journal*
reported that I—Philip **Emeagwali**—
invented
that parallel processing technology
could be used to manufacture
the modern massively
parallel processing supercomputer
that is faster than
the conventional vector processing
supercomputer
and, more importantly, faster than
any vector processing supercomputer

and faster by a factor of
64 binary thousand.

35.2.4 Discovering the Fastest Supercomputer

Fast computation
defines the computer.
Recording a **never-before-recorded**
speed in computation
redefines the supercomputer
and redefines the boundary
of human knowledge.
The fastest computation
is the only objective
and the only measurable contribution
to the development of the computer.
That is why we see search terms
such as:
“Nigeria’s contribution

to the world of computer."
Or see search terms
such as:
"The Nigerian who invented
the internet."
The discovery
is the most important contribution
that Nigeria can make
to scientific knowledge.
The invention
is the most important contribution
that Africa can make
to technological knowledge.
My invention
of how to compute faster
and how to communicate
my computational workload
and how to do both **across**
a new internet
and how to compute
while reducing **180 years**

of **time-to-solution**
on only one isolated processor
to just one day
of **time-to-solution**
across a new massively parallel
processing supercomputer
that is a new internet *de facto*
is my technological contribution
to the development of the supercomputer
that is a new internet.
That invention
increased our knowledge
of the new supercomputer
that is a new internet *de facto*,
and that is not a computer *per se*.
That invention
inspired the use of ten million
six hundred and forty-nine thousand
six hundred [10,649,600]
processors that were already available
in the market

that are now used by
Chinese supercomputer scientists
and used
to perform the world's fastest
computation.
Harnessing those ten million
six hundred and forty-nine thousand
six hundred [10,649,600]
processors that were already available in
the market
is what enables the modern
supercomputer scientist
to compress
thirty thousand [30,000] years
of computer time
to just one day
of supercomputer time.
That invention
of the modern supercomputer
is the reason
millions of American children

have done school reports on
Philip Emeagwali.
That invention
of the massively parallel processing
supercomputer
is the reason Google auto-suggest
suggests my name—**Philip Emeagwali**—
first, when the search term is
"contributions to the development
of the computer."
I believe that
the supercomputer of today
will become the computer of tomorrow.
We believe that
Moore's Law has reached its
speed limits.
In the 1970s and '80s,
I was ridiculed,
often mocked, and unanimously rejected
when I submitted to vector processing
supercomputer experts

my massively parallel processing
supercomputer research reports
and computations.
My 1,057-page supercomputer report
of 1989
described how I harnessed
the power of the massively
parallel processing supercomputer
and how I achieved
that technological breakthrough
and achieved it
on the Fourth of July 1989
in Los Alamos, New Mexico,
United States.
The reason I did my supercomputer
research alone
and did it during the sixteen years
—onward of June 20, 1974—
was because the consensus
of the leaders of thought
in sequential processing

and vector processing supercomputing
was that parallel processing
supercomputing
—or computing many things
(or processes) **at once**,
instead of computing only one thing
at a time—will forever remain
a huge waste of everybody's time.
The reason I continued,
since June 20, 1974,
to pursue parallel processing
and to do so at the time
parallel processing machines
were abandoned
was that I felt that
the most promising line
of research on fastest supercomputing
will paradigm-shift
from serial and vector computing
to massively parallel supercomputing.
Looking back retrospectively,

the May 8, 1987 issue
of *The Chronicle of Higher Education,*
carried an article that was titled:

[quote]
"Some Hail 'Computational Science'
as Biggest Advance
Since Newton, Galileo."
[unquote]

Fast forward three years
from that article,
the June 27, 1990 issue of
The Chronicle of Higher Education
wrote that I
[quote]
"took on an enormously difficult
problem...
solved it alone,
has won computation's top prize,
captured in the past

only by seasoned research teams."
[unquote]

That *Chronicle of Higher Education*
article
continued:

[quote]
"If his program can squeeze out
a few more percentage points,
it will help decrease
U.S. reliance on foreign oil."
[unquote]

Computing and supercomputing faster
–and doing both via massively
parallel processing—
is the most important discovery
in computing and supercomputing.
The discovery is like a dim lamp
in a dark cave.

My invention
of the massively parallel processing
supercomputer
that is a new internet
led to a paradigm shift
that redefined the modern
supercomputer
and redefined it
as supercomputing many things
at once,
instead of computing
only one thing
at a time.
In the old **sequential processing**
supercomputing paradigm,
the first supercomputer in the world
to execute one million instructions
per second,
which I began programming
back on June 20, 1974
in Corvallis, Oregon

was powered by only one
isolated processor.
That one processor
was not a member
of an ensemble of processors
that communicates and computes
together
and do both as one seamless, cohesive
supercomputer.
In my new **parallel processing**
supercomputing paradigm,
the modern supercomputer
is powered by up to ten million
six hundred and forty-nine thousand
six hundred [10,649,600]
processors that were already available
in the market anyway.
The reason school projects are done
on the contributions
of **Philip Emeagwali**
to the development of the computer

is that I invented
the pre-cursor
to the fastest supercomputer
of today.
That invention
of the massively parallel processing
supercomputer
contributed to the **surer** and **deeper**
understanding
of the modern supercomputer
and contributed
to the **greater** understanding
of how to solve the toughest problems
arising in the most extreme-scaled
physics-based simulations
and how to solve them **across**
a new ensemble of processors
that is a new internet.
That invention
of the massively parallel processing
supercomputer

showed that the impossible-to-compute
is, in fact, possible-to-compute.
That invention
of how to process many things **at once**,
instead of processing only one thing
at a time
was the starting point
of the modern computer.
I experimentally discovered
that using only one processor
to solve the toughest problems
arising in extreme-scale
computational physics
was like putting the wings
of a jet aircraft
upon an ocean liner.