

1 How I Reached the Frontier of Internet

Philip Emeagwali



My Quest for an internet

In this, the 34th installment of our weekly series at emeagwali.com, we present Part 10 of Philip Emeagwali's lecture on how he programmed 65,536 sub-computers that were connected as an internet to perform the fastest computation of 3.1 billion calculations per second in 1989 as well as communicate the fastest emails of 65,536 unique messages synchronously sent and simultaneously received to as many sub-computers. This article was transcribed from Philip Emeagwali's lecture delivered in Geneva, Switzerland on April 26, 2010.

How I Reached the Frontier of Internet

by [Philip Emeagwali](http://emeagwali.com)

emeagwali.com

The lecture [video](#) is posted at emeagwali.com.

My journey to the far-edge of science did not begin in America. It began at Yoruba Road, Sapele, in January 1960. It continued at Agbor Road, Uromi in 1962 to

Gbenoba Road, Agbor in 1964 to Saint George's Grammar School, Obinomba in 1966 to Christ the King College, Onitsha where they renamed me "Calculus."

My secret was to focus on the most important law in physics which, in turn, led me to the most important formula and equations in mathematical physics and finally, to the supercomputer that communicates as an internet.

After 15 years in America, I pushed the frontier of calculus by inventing 72 partial differential terms, which are the most advanced expressions in calculus. I told my son, Ijeoma, that it takes 15 years to become an overnight success.

Mathematics, however, has a large diameter that makes it impossible for one person to know it all or solve any of its millennium or grand challenge problems in less than 15 years.

My *Aha!* Moment occurred when I realized that mathematics is too vast for one person to master. My secret was to focus on the most important law in physics which, in turn, led me to the most important formula and equations in mathematical physics and finally,

to the supercomputer that communicates as an internet.

It took me fifteen years to put the dots together and develop the connections between the physics, mathematics and computing, as well as to acquire the supercomputers I used to solve the grand challenge problem on an internet.

It took me fifteen years of blood, sweat and tears of triumphs and tribulations, to move the grand challenge problem from the storyboard to the blackboard to the motherboard and finally solve it by emailing my recalculated solutions via one million internet pathways to 65,536 email addresses on 65,536 sub-computers.

It took me fifteen years to become an 'overnight' success! It was my

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infinite patience that produced my immediate results.

True innovators understand that the technique of the calculus is not isolated from the technology of the computer, which is a tool for solving problems in physics. The innovator's knowledge of all three subjects is part of a connected whole.

The [video](#) of this speech is posted at emeagwali.com.

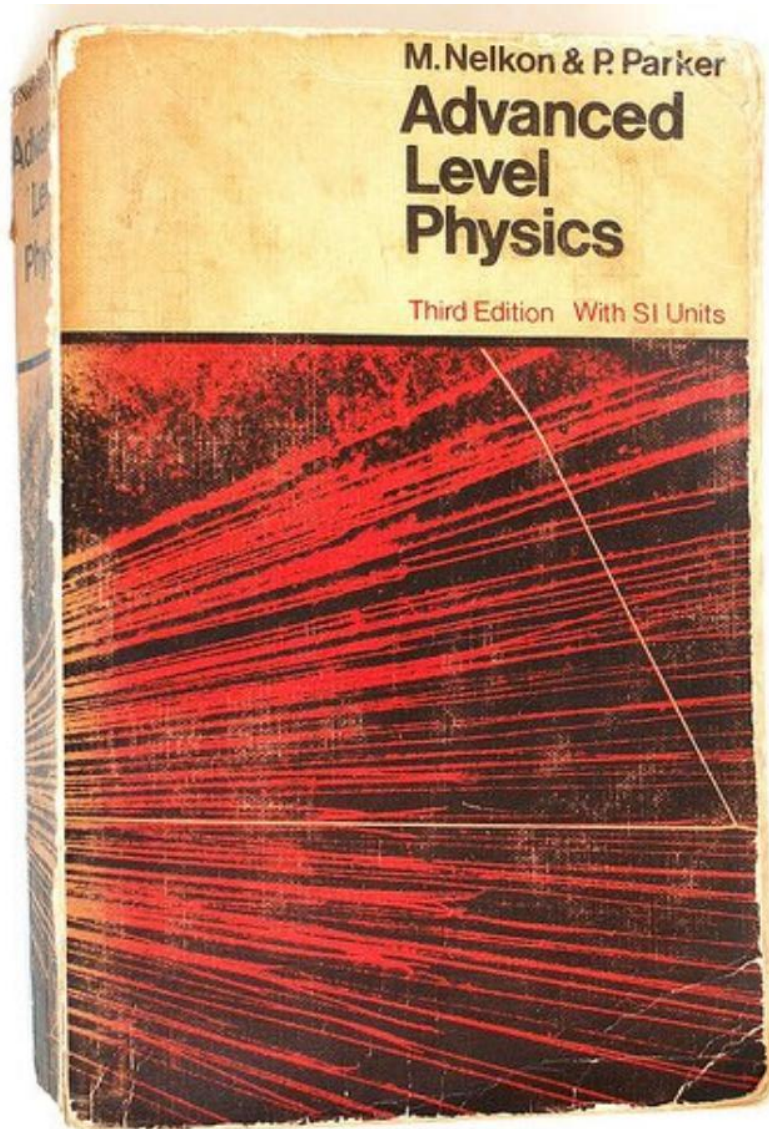


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"Advanced Level Physics" by Michael Nelkon and Philip Parker was first published in 1958. I used the 1970 edition of this book to self-teach myself during after school hours at [then named] Sacred Heart Primary School in Ibusa (Nigeria) in 1972. The mathematics I created came from the Second Law of Motion taught in a first course in physics, or what universities offer as "Physics for Poets."

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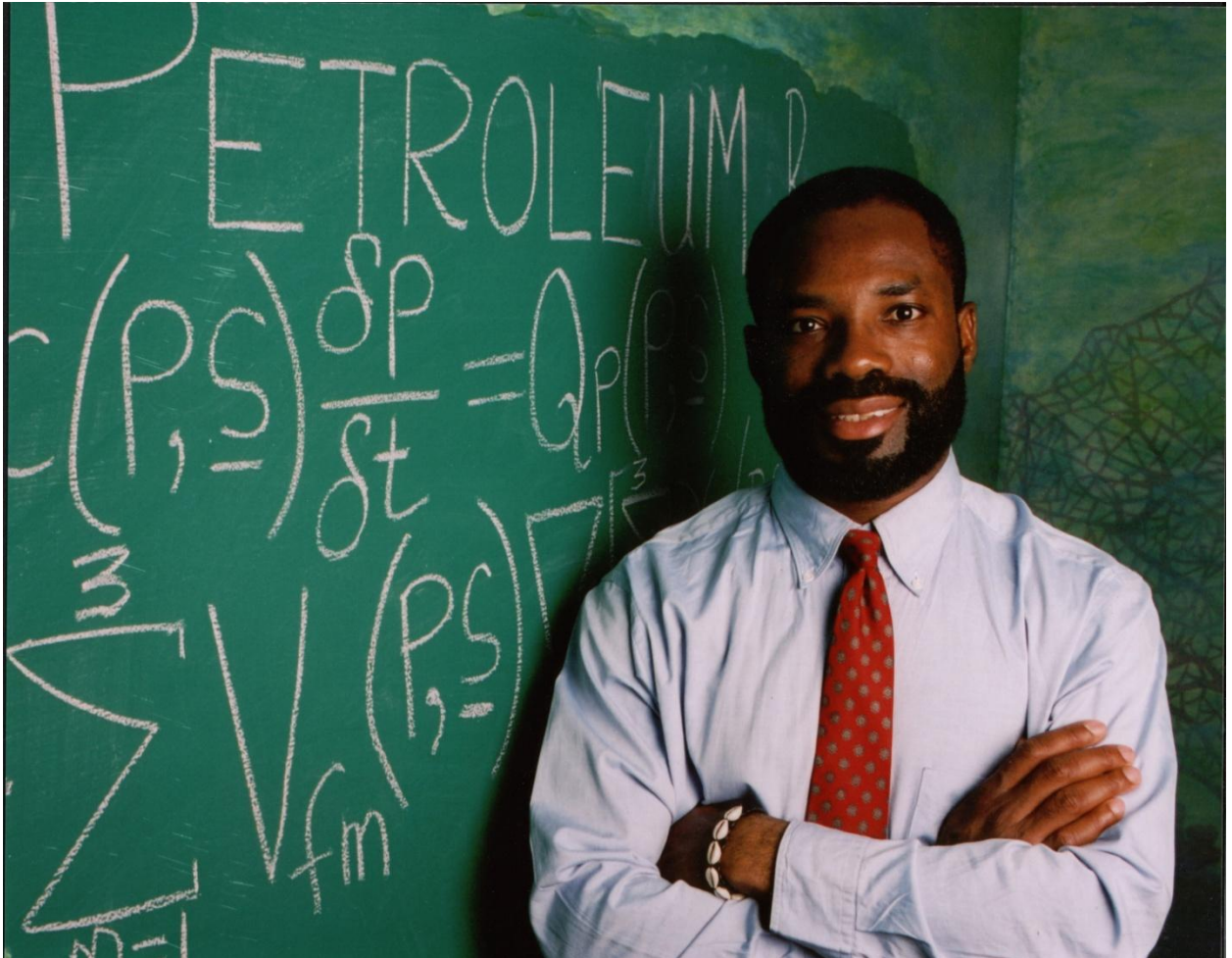
Philip Emeagwali



This is the publicity photo for a lecture I gave on July 8, 1991 at *ICIAM '91*, which is the World Cup of Mathematics. I told the field's foremost experts that my new mathematics came from inside a petroleum reservoir. [Philip Emeagwali, 1990]

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I write on the board the actual equations used by Exxon (now Exxon Mobil) to simulate the flow of oil, water, and gas inside its reservoirs. I discovered that their equations did not reflect reality and corrected their error.

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$$u(x,t) = (u_i(x,t))_{1 \leq i \leq n} \in \mathbb{R}^3$$

$$p(x,t) \in \mathbb{R}, x \in \mathbb{R}^3, t \geq 0$$

$$\frac{\partial}{\partial t} u_i + \sum_{j=1}^n u_j \frac{\partial u_i}{\partial x_j}$$

$$= \nu \Delta u_i - \frac{\partial p}{\partial x_i} + f_i(x,t)$$

$$(x \in \mathbb{R}^3, t \geq 0)$$

$$\operatorname{div} u = \sum_{i=1}^n \frac{\partial u_i}{\partial x_i} = 0$$

$$(x \in \mathbb{R}^3, t \geq 0)$$

$$u(x,0) = u^0(x) \quad (x \in \mathbb{R}^3)$$

$$\Delta = \sum_{i=1}^n \frac{\partial^2}{\partial x_i^2}$$

An excerpt from my research notebook. It's my 1983 version of my 1989 equations, which was later restated on the above green board.

This is the most advanced and most important system of equations in calculus. It's the only equation cross-listed in both the Seven Millennium Problems of mathematics and the 20 Grand Challenges in supercomputing.

In essence, it says that the Second Law of Motion holds at all times and places, or that $F=ma$.

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Date: 6/28/2006, 6:33 pm, GMT +6

Name: nwike <134.146.0.6>

Location: ikechukwu

Number: 43

Philip Smeagwali

How long shall they kill our Prophets while we stand aside and look? How long shall they steal our resources? How long shall we lose our brains and intellects to them. Africa unite.

Date: 6/27/2006, 3:25 pm, GMT +6

Name: Obunikem
Abomobi <193.220.178.42>

Location: Obosi in Anambara state

Number: 42

I am proud of you as nwa afo Igbo. Part of our responsibility as Nigerians in diaspora is to continue to engage in 'think home philosophy'; trying to know if we can take home some of our great achievements abroad.

I think you are already engaged in this, but you can still convince your friends and associates to go and invest in Nigeria and

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in ala Igbo particularly.

Keep moving to greater heights. We support you with prayers. You are an asset to our world. You have made the black man proud in the computer world.

Date: 6/25/2006, 8:05 pm, GMT +6

Name: daniel <80.78.16.200>

Location: nigeria

Number: 41

i want 2 b like u b'cus i want 2 b a internater

Date: 6/25/2006, 7:16 pm, GMT +6

Name: Cletus Oseloka
Ugoabunwa <213.209.161.169>

Location: Ojoto Unoh ,,Anambra.Nig

Number: 40

Philip Smeagwali

To God be the Glory Great things He has done in the life of our brother ,Emeagwali..thank God for the wisdom and intelligence vested on him.....Remain blessed Great one.....and love you.

Date: 6/25/2006, 5:09 am, GMT +6

Name: Russell Buckley <62.254.64.19>

Location: UK

Number: 39

The story of your upbringing in Nigeria is truly inspiring.

Date: 6/24/2006, 7:16 am, GMT +6

Name: Tunde Adesanmi <80.78.17.108>

Location: Nigeria

Number: 38

Philip Smeagoli

i realy dont know hoe to begin but i just have to coment your great job,..i read a lot bout u and the great things you have done,...i wish i was u and u were me cos i love morethan i love myself already,...keep the flag flying phillip,...there is no place like home brother,...plZZ come home my happiest day will b when i eventually get to me you in person,...I LOVE YOU,...

Date: 6/21/2006, 8:51 pm, GMT +6

Name: Moeketsi Mokati <196.20.31.121>

Location: Namibia

Number: 37

One of our very own son of the soil....We are proud of you. Continue to instill the pride and love of the continent

Date: 6/20/2006, 10:06 pm, GMT +6

Philip Emeagwali

Name: nwife <134.146.0.27>

Location: ikechukwu

Number: 36

Can anything good come out of Africa? When you watch CNN, Africa is being portrayed as the land infected with wars, diseases, hunger, strife, corruption, with our cities being given a ghetto status. What a deceit from them who came here to rape our women, exploited our resources and planted a seed of discord among us. They are still on it even now. Only time and God will execute judgement on them. We will always prove to them that we are not descendants of apes. The first shall be the last and the last shall be the first, i believe strongly on this though it might not happen in my generation. So big Bros keep embarrassing them with your astonishing discoveries. Whether they like your colour

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or not they must bow to you to tap from your wealth of experience. But remember that that which you are doing over here can equally be done here. Aku rue ulo.....

Date: 5/11/2006, 12:53 pm, GMT +6

Name: Aq <172.134.142.198>

Location: dc

Number: 35

I am a law student at the Howard University School of Law. I along with a couple of my friends are putting together a nonprofit event in the NY/NJ area during the weekend of June 30-July 2nd, called the Metro College Reunion. I would like to invite you and everyone to this event as a guest, and if possible as one of the individuals to sit in on our panel.

This event is not like your regular reunion.

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There are two underlying purposes; (1) to create a venue where people will meet with other young professionals to network, and (2) to create a venue where people who attended school in Nigeria will meet up with fellow alums with the sole purpose of exploring ways to help the education system in Nigeria. Which school you donate to, what to do with the money and how to organize for the donations is entirely up to the attendees.

Our role in this is merely to provide a venue to make it happen. We have put together quite a most enjoyable and entertaining weekend because we believe that we might as well get started on being "the leaders of tomorrow".

I hope you can attend this event because at the forefront of creating a better and progressive Nigeria, we need people of Nigerian ancestry such as yourself who are making a difference today.

Philip Smeagoli

If you are interested in attending this event or in helping us with the forum, please feel free to e-mail us at reunion@gssso.net or visit our site at <http://gssso.net/reunion2006..>

For more information on this event and the many activities which include a forum/panel discussion on "Networking strategies; What works and What doesn't", picnic and a Cruise; please go to <http://gssso.net/reunion2006>.

Thank you for your time!!!

Aq

Date: 6/16/2006, 4:34 am, GMT +6
Name: nwimo ifeanyi <196.201.151.4>
Location: awka nigeria
Number: 34

Thanks for putting the anambra map on

Philip Smeagoli

the global wall of fame through your
supercomputer breakthrough. please keep
nigeria flag flying anywhere you are. Above
all CHETA UNO (THINK HOME)