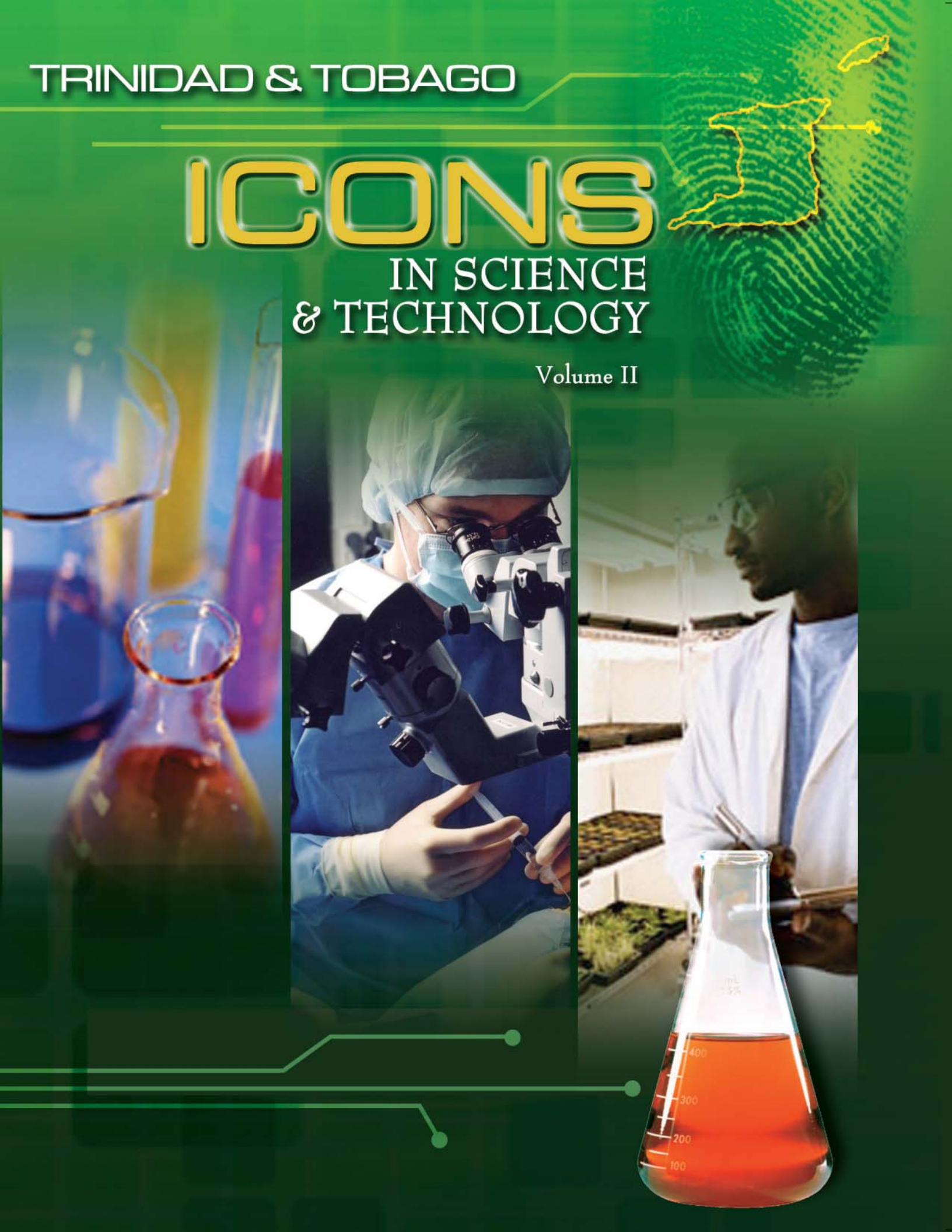
TRINIDAD & TOBAGO

# ICONS
## IN SCIENCE & TECHNOLOGY

Volume II



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# ICONS IN SCIENCE & TECHNOLOGY

Volume II


National Institute of Higher Education, Research, Science and Technology (NIHERST)

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# Contents




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# Introduction

## Our Scientific Heritage

*"History is to the nation as memory is to the individual. [Just] as persons deprived of memory become disoriented and lost, not knowing where they have been and where they are going, so a nation denied a conception of the past will be disabled in dealing with its present and its future. 'The longer you look back,' said Winston Churchill, 'the farther you can look forward.' "*

*Arthur M. Schlesinger Jr., American Historian and Author*

NIHERST is pleased to present this second volume in the Trinidad and Tobago Icons in Science and Technology series, which was launched at the end of 2005. The series showcases the lives and achievements of individuals who have attained a high level of distinction, world-class in most cases, in their respective spheres of endeavour. While the main focus of the series is on individuals who worked, or are working, in strictly scientific and technology-related fields, the scope also extends to persons who, through their creativity and hard work, have distinguished themselves in other disciplines and professions, and whose innovations are, nevertheless, considered scientific and/or technological. By including their profiles, the aim is to illustrate that there is "science in everything", and that knowledge and human ingenuity, applied to any area of activity, including the cultural or artistic, can lead to tremendous innovations and new technologies which will enhance and spur the development of that arena.

It is our hope that this series will serve a number of equally valid purposes. The first is to commemorate the men and women whose excellence in a range of important domains helped to shape institutions and advance professions, both locally and abroad. They are among the forerunners, pioneers and creators who have contributed to building a veritable national scientific heritage of which we should all be very proud. At the same time, these publications are meant to add, however modestly, to our historical records and, hopefully, to be of use as a teaching aid and/or reference material for secondary level students.

By raising the visibility of these icons, we are also seeking to present, to current and successive generations, another kind of national hero or role model, whom we would wish to see many more of our young people emulating. We hope that *Trinidad and Tobago Icons in Science and Technology* will play a part in inspiring our students, and in cultivating a sense of pride, identity, connection and continuity in the next generation of scientists and national leaders.

# Wilfred Chan

## NATURAL PRODUCTS CHEMIST

Professor Wilfred Chan was one of the "founding fathers" of the Department of Chemistry at the Mona campus of The University of the West Indies (UWI) who introduced and developed the field of natural products research. He initiated studies on marine natural products in Trinidad and Tobago and did extensive fundamental work on terrestrial Caribbean flora. In addition to being on the staff of the Faculty of Natural Sciences on the campuses in Jamaica and Trinidad for 40 years, he also lectured in North America and at the *Universidad Central de Venezuela*[1]. His postgraduate students and their own students have made their mark in natural products chemistry throughout the world, in both industry and academia.

Wilfred Chan was born on 26th April, 1931 in New Amsterdam, Guyana. He attended Rosignol Government School and received a scholarship to Berbice High School in 1941. He completed his Senior Cambridge Certificate, earning a scholarship to Queen's College in 1946 where he achieved the London Higher Certificate and earned an Open Scholarship to the University College of the West Indies (UCWI) now UWI.

Chan completed his Bachelor of Science (BSc) General in two years and gained a Geddes Grant Fellowship to pursue postgraduate studies in organic chemistry in 1953. In 1957, he became the first UCWI graduate to complete a doctorate. This was followed by a Carnegie Postgraduate Fellowship at the Imperial College London and the University of Glasgow under the tutelage of Nobel Laureate, Sir Derek Barton.

In 1958, Chan joined the staff of UCWI in Mona, Jamaica as an assistant lecturer in chemistry. He rose through the ranks and was appointed Personal Chair in Organic Chemistry in 1970. He served as Dean of the UWI Faculty of Natural Sciences from 1972 to 1974 and headed the Department of Chemistry from 1973 to 1976. He then accepted a Senior Fellowship from the International

Development Research Centre to conduct research at the University of Toronto and the University of British Columbia. After returning to Mona, he transferred to the St. Augustine Campus in 1978. He also served as External Examiner to the University of Guyana for many years.

Professor Chan was the Organising Secretary of the inaugural meeting of the Caribbean Chemical Conference, which was held in Mona in 1963 and again in 1969. He also co-founded the Mona Symposium on Natural Products and Medicinal Chemistry in 1966 which continues to this day. The 1992 Symposium was dedicated to him, and he was made Conference Life Chairman in recognition of his exceptional contribution.

Professor Chan retired from UWI in 1996 and was awarded the title of Professor Emeritus in Chemistry. During his long tenure, he supervised a number of postgraduate students who went on to hold academic positions at all three campuses of the university. After retirement, he remained active in teaching and from 1998 to 2002, he served the scientific community in the region through his presidency of the Caribbean Academy of Sciences.

In recognition of his outstanding achievements, Professor Chan was awarded a Centenary Medal by the Institute of Jamaica in 1981, and was named a Distinguished Graduate of The University of the West Indies at the 50th Anniversary Celebrations held in 1998. In 2000, the Government of Jamaica awarded him the Order of Distinction, Commander Class (CD).

His advice to youngsters is; "Know clearly what you want to do and then pursue it."

*1 – Central University of Venezuela*

From Left to Right:

1. Receiving the Order of Distinction from the Governor General of Jamaica, 2000
2. Chan, last in third row, at UCWI in 1954
3. Picture of UWI, Mona Campus

# Rudolph Valentino Charles

## STEELPAN INNOVATOR

Rudolph Valentino Charles is a figure of national importance in the development of the steelpan. This legendary "panman" was involved in the invention of six different types of steelpan. He was also a steelband leader, a world-class tuner and a true and versatile innovator.

Charles was born on 1st October, 1938 in Laventille, Trinidad. His father was a civil servant who had earned tremendous respect in his humble community. In the late 1950s, he was part of the talented small band called Spike Jones. In 1958, at the age of 20, Charles gravitated towards the Gay Desperadoes Steel Orchestra and was made leader three years later because of his ability to read music. In 1965, the orchestra entered into a sponsorship agreement with the West Indian Tobacco Company (WITCO), providing Charles with the financial backing he needed to implement his many innovative ideas for the steelpan. In 1970, the band won Panorama and began touring the USA and Europe. Later on, the band's name was changed to the WITCO Desperadoes.

Charles became affectionately known as "The Hammer" because he was a keen disciple of the art of tuning and constantly carried a tuning mallet in his hand, always ready to find the perfect note. He gave the WITCO Desperadoes its characteristic mellow, organ-tone that it has kept even to this day. Ever willing to experiment with ways to improve the instrument, Charles was the first to chrome pans, which enhanced their tonal quality, durability and appearance. He was also the first to improve the steelpan canopies by using aluminium to make them, and by designing them in a new shape. These innovations improved sound quality and made the steel orchestras more aesthetically presentable on stage.

Charles' creativity led to the development of several new instruments that are visible in all steel orchestras today. He collaborated with master tuners such as Bertram "Bertie" Marshall and Lincoln Noel, which led to the invention of the Rocket Pan (1971–1972), named for its unique shape, the Twelve Bass set of pans (1975–1976), the Quadraphonic Pans (1978) and the Triple Second Pan with foot bass.

Rudolph Valentino Charles died on 29th March, 1985. His successes as an innovator, tuner and bandleader from 1958 to 1985 are highly regarded in the steelpan fraternity. In tribute to these outstanding contributions, Pan Trinbago created the Rudolph Charles Award for Innovation in the creation of steelpans.


From Left to Right:

1. The steelpan
2. The WITCO Desperadoes in concert
3. "The Hammer"

# Mervyn Chen

## INNOVATOR

Mervyn Chen was the top prizewinner in the Process Category of the Prime Minister's Awards for Innovation and Invention in 2000. He designed and patented the Thru-Tube Backsurging Tool, which is now in use in the American oil industry. In 2002, he designed and patented a Downhole Magnetic Pump for oil extraction that would make costly, bulky pumping jack units obsolete. The technology is currently used in the USA, on a long-term trial basis. He also developed a method to generate electricity using well pressures, which also has a US patent pending.

Mervyn Chen was born on 10th January, 1945 in Dow Village, California, Trinidad. He attended San Fernando Boys' R.C. and Presentation College, San Fernando. At school, he was fascinated by physics because he was curious about how things worked.

He attended Sacramento City College in California, USA from 1964 to 1966 and was accepted by the University of Illinois to pursue architecture but was forced to return to Trinidad and Tobago in 1966 due to illness. Despite this, he never lost his passion for design or his industriousness. Even as he assisted his father with the family bakery, Chen opened a printery in 1967 and later diversified into companies that made steel products, rented out equipment, and carried out photo finishing. In the mid-80s, he sold his company and immigrated to the United States, where he started another manufacturing company specialising in steel products, and completed significant work for Coca Cola, the US Army Corps of Engineers, Disney, and the Marriott Hotel.

While on a visit to Trinidad and Tobago in 1990, a friend of his mentioned that petroleum companies had difficulties keeping their oil wells clean. Intrigued by this problem that

no one could fix, Chen did extensive research and experimentation to design a tool for this purpose. A prototype was developed and tested in Trinidad and in 1992, he obtained his first local patent for the Thru-Tube Backsurging Tool. The invention successfully increased oil production and he sold the license in 2002 to a US company.

Chen also developed a water-making device, which uses the principle of condensation to extract water from the atmosphere. He also designed, manufactured and sold clocks and mobile toys in the US. Currently, he is working on two automated machines for the construction industry, a device for the electrical industry, a walking aid for the disabled, and equipment to assist in the relief of floods.

Mervyn Chen reveals that his inventions start by him simply being constantly aware of his surroundings and looking for solutions to problems and easier ways of doing things. When he is not inventing, he enjoys fishing and practises the ancient art of bonsai.

This self-made innovator epitomises his words of advice; "If you don't have someone to teach you, teach yourself," and lives by his motto, "Desire, attitude and discipline." He advises students that; "Invention is always easy; the difficulty is determining what the problem is. If you pay close attention, you can see the solution to the problem."

From Left to Right:

1. Receiving the Prime Minister's Award for Innovation in 2004 from NIHERST's President Mrs Maureen Manchouk
2. An oil pumping jack
3. Chen tending to his Bonsai plant

# Denzil Fernandez

## STEELPAN INNOVATOR

Denzil "Dimes" Fernandez has been a steelpan innovator, tuner and educator for over 50 years. He pioneered the Bore method, which produces steelpans with greater tonal range and clearer, longer notes, and used it to create the Bore Pan, Panzer, Duo Bore Pan, U Bass/Den Pan, Bore Reed Pan, and the Bore Reed Cello Pan.

Born on 24th May, 1944 in Belmont, Trinidad, Fernandez attended St. Margaret's Boys E.C. School. He joined the Belmont Symphony Orchestra in 1956 but hid his new talent from his disapproving father.

His first attempt at pan tuning failed but when Lauriston McGill became his mentor, his second attempt succeeded and a life-long skill was born. Although Fernandez did occasional tuning for the West Side Symphony and performed in five bands over 12 years, he earned his living through offset lithography, which he had learned at the John Donaldson Technical Institute in 1970.

In 1984, Fernandez read a university physics textbook and learned about basic acoustics. With this knowledge, he theorised that replacing the characteristic steelpan groove with several cuts would allow faster steelpan construction. However, he lacked the equipment needed, and used a drill to make holes instead of cuts. The first Bore Pan was completed in July 1984 and Fernandez received the Rudolph Charles Award for its creation. The Bore method improved pan design and tonal quality, also providing superior amplification, ensuring that a musical ensemble made of Bore Pans could be smaller (and thus less costly) than a standard band.

Fernandez conducted his first pan construction workshop for Pan Development Unlimited in 1984, the first of five between then and 2000. In 1985, he quit his job as a

lithographer to concentrate on innovation. In January 1987, the U Bass/Den Pan was created, combining the six bass instruments into a single unit. The Panzer followed in February 1987, combining the steelpan and guitar to produce a new tone. The Dual Bore Pan, Bore Reed Pan[1] and Bore Reed Cello Pan were designed between 1987 and 1988.

Fernandez lectured on tuning and steelpan construction for the Ministry of Sports and Culture from 1987 to 1989. In a separate series sponsored by NEMWIL Insurance, he lectured to schools, state agencies and other organisations. He also served the Bureau of Standards as a consultant on steelpan standardisation and the mechanisation of steelpan construction.

Internationally, he served as the tuner for seven bands in Washington D.C. between 1991 and 1999, the World Missions Steel Orchestra (1992), as well as the Kawaguchi High School (1995–1999) and the Supersonic Steel Drum Academy (1997–1999) in Japan. He taught pan construction techniques for the Pan Rising Company in Japan, and in 2000, he taught pan construction and tuning in Amsterdam, Holland.

Today, Fernandez resides in Trinidad and travels throughout Europe, Japan and the United States sharing his skills. Despite its effectiveness and popularity abroad, the Bore method remains an unconventional construction method to local steelpan makers, who limit its application to frontline pans.

*1 – A design that introduces a "reed" at the end of the note dent, creating a small, U-shaped groove that lowers the frequency of the musical note it produces. Reeds can be tuned independently of the steelpan's note dents and provide pan makers with options for customising ther creations. This variant has not been used widely.*

News

'Dimes' invents duo pan

DENZIL "DIMES" FERNANDEZ, the man who in 1992 invented the bore pan has recently created another adaptation of the instrument.

The musician has invented what he calls the duo pan, which he says is really three pans in one. The new instrument features two tenor bore pans fused together so that the pannists face each other while playing.

Fernandez said he created the pan in an effort to extend the range of the single instrument. He added that he plays classical guitar and was always impressed with its wide range, which he said can run from deep bass to treble.

"I was looking for a different twelve. I wanted to have as wide a range as I could on one single instrument. It took me about three months to create this prototype," Fernandez said.

He said there are a number of features in the duo pan that will attract pannists.

"The duo pan is two single pans merged to form a single resonant system, of which either unit can be played simultaneously or one at a time in succession. It facilitates easy amplification. A wider tonal range. Each unit can be tuned with its own tone colour and the merged pans generate a unique timbre. The duo pan effective," de Coteau said.

tras in Europe, Holland, Japan

**From Left to Right:**

1. Fernandez sinking a steelpan
2. Fernandez first from left with pan makers in Holland
3. Trinidad Guardian (4th October, 2001)

# Hedy Fry

## GENERAL PRACTITIONER

Dr Hedy Fry is celebrated in Canada for promoting medicine and popularising health issues through politics and the mass media. Most Canadians today know her as a politician, but she dedicated many years practising as a family doctor and improving conditions for medical professionals and patients. In her practice as a family doctor, she delivered over 800 babies.

Hedy Fry was born on 6th August, 1941 in San Fernando, Trinidad. She attended San Fernando Government School and St. Joseph's Convent. She won an Island Scholarship in English Literature to Oxford University but became interested in medicine while reading a reference book that described many of Shakespeare's tragic heroes as having psychiatric problems.

Her parents sacrificed financially to send her to the Royal College of Surgeons in Dublin, Ireland. She earned the equivalent of a bachelor's degree in science in one year and completed her medical studies with honours, winning a silver medal in applied physiology.

In 1970, Dr Fry emigrated to Canada where she practised family medicine at St. Paul's Hospital, Vancouver for 23 years and held positions in various medical bodies. As President of the Vancouver Medical Association and the British Columbia Medical Association, she initiated Canada's first retirement plan for doctors. She lobbied with the Federation of Medical Women of Canada (FMWC) for paid pregnancy leave for female doctors. As a result of her activism, the Federation also introduced flexible times and shared residency for demanding practices such as surgery, to allow female doctors more family time.

As a leader in the Canadian Medical Association (CMA), Dr Fry spearheaded the recommendation for self-determination and self-government for aboriginal peoples in order to improve their health status. She represented the Association in the United States and dealt with issues of healthcare financing and delivery. Dr Fry also lobbied to have the government pay more attention to the

impact of global warming, environmental issues, mandatory seatbelt and helmet laws, and mandatory physical education in schools.

Dr Fry participated in the CBC "Doctor Doctor" national television series from 1985 to 1988. The series educated viewers about general health, common diseases, and health issues such as child obesity, nutrition, pregnancy and the effects of alcohol, and maternal care. The series was so successful that it was rerun for three years.

Dr Fry was editor of the FMWC newsletter and a member of the *Medical Post* editorial board. She served as Chair of the Obstetrics Committee of the CMA. She was recognised as a Dr Hirsh Rosenfield Distinguished Lecturer in Family Medicine at McGill University in 1994, and was named the *Primus Inter Pares*[1] by the Vancouver Medical Association in 1995.

She served in the Federal Government's Cabinet as Minister of State for Multiculturalism & Status of Women for six years, as a Member of the Standing Committee on Health in 1994 and 2002, as Parliamentary Secretary to the Minister of Health between 1993 and 1996, and as Parliamentary Secretary for Human Resource Development & Immigration from 2004 to 2005. Hedy Fry is currently in her sixth term as an MP and has been the Opposition Critic for Sport and the 2010 Games, Opposition Critic for Heritage and is currently the Chair of the Parliamentary Committee on the Status of Women.

Hedy Fry's aspiration is to continue influencing the Government of Canada to improve the lives of all Canadians. Her advice to young students is; "Life should be about finding your talent and pursuing it. You must leave the world knowing you made it a better place."

*1 - Latin for First Among Equals- a title indicating leadership or seniority among individuals who are technically equal in rank*

From Left to Right:

1. Chinese New year celebration in Chinatown
2. Fry with Smokey Smith, last surviving recipient of the Victoria Cross for bravery (since deceased)
3. Canada Day, Granville Island celebrations

# Samuel Ghouralal

## NEUROSURGEON

Dr Samuel Ghouralal rose to fame by virtue of his dedication to a profession that was non-existent in Trinidad and Tobago when he began to practise. He single-handedly established neurosurgery in Trinidad and Tobago, and, as he built the country's capacity in that field, he adopted modern innovations to improve the treatment and diagnosis of patients' disorders.

Samuel Frank Clarendon Ghouralal was born on 27th February, 1925 in Guapo, Trinidad, where he attended the village primary school. He began his secondary education at Naparima College and completed it at St. Mary's College, before going to Canada to further his studies. In Montreal, he pursued his Bachelor of Medicine and Surgery (MDCM) at the Medical School of McGill University, graduating in 1949. He was certified in neurosurgery in the state of New York in 1956, and returned to Trinidad that year, ignoring intense dissuasion from a senior official at the Ministry of Health in his home country, who advised that neurology was for "New York, Baltimore, Montreal or London."

Dr Ghouralal found no immediate employment because there were no openings at the local hospitals. However, he fervently lent his skills and expertise to his fellow practitioners, performing eight operations with limited instruments in the first two weeks of his return. Former classmate, Dr Carl Lee, commended Ghouralal's choice to persist, helped secure interviews for him, and gave him a place to stay. Dr Winston Mahabir, another classmate, used his influence to publicise his colleague's expertise in a field that was "crying out for exploration."

Around that time, a relative of the Minister of Health suffered a diving accident that resulted in a neck fracture and partial paralysis. The boy's family insisted that Dr Ghouralal operate, which he did, and he also guided the

hospital staff in the boy's post-operative care. A full recovery resulted and the impressed Minister instructed the Director of Medical Services to create a post for Ghouralal.

Dr Ghouralal was assigned part-time to both the Port-of-Spain General Hospital and San Fernando General Hospital. The hours were overwhelming, sleep was rare, and the financial reward was minimal. When Dr Mahabir became the Minister of Health later in 1956, Dr Ghouralal was then given a full-time position. He ensured that the departments of neurosurgery had the best equipment and trained nurses, thus increasing their efficiency and reputation.

Dr Ghouralal's renown as the country's only neurosurgeon steadily grew and there was even a calypso about him. The pinnacle of his fame came in 1957, when he excised a brain tumour from an American soldier. The patient's spectacular recovery enabled him to be walking again within two days! Ghouralal's reputation spread across the region and he was soon being called to St. Vincent, St. Lucia, Barbados and Guyana to perform operations and give advice.

With budding neurosurgeons joining the service, Dr Ghouralal became the country's Senior Neurosurgeon. The training programme he initiated within the hospital gained the recognition of The Royal College of Surgeons in England. Because of his knowledge and experience, he earned the nickname of "The Guru." Dr Ghouralal went on to serve as President of the Medical Association in 1964, and was assistant Hospital Medical Director between 1970 and 1982, finally retiring in 1985.

For his sterling contribution, the Trinidad and Tobago Medical Association presented him with a Scroll of Honour in 1980. In 1989, he received the Chaconia Medal (Gold), the nation's second highest award.

Dr Samuel "The Guru" Ghouralal passed away on 6th April, 1991 at the age of 66.

From Left to Right:

1. Shot of Port-of-Spain General Hospital
2. Ghouralal at home with his wife Marie, 1988
3. Dining at the President's House, 1991

# Robert Lechmere Guppy

## GEOLOGIST

Robert Lechmere Guppy had no formal scientific training but his meticulous approach to research, coupled with his love of invertebrate palaeontology[1] and geology, allowed him to publish many papers of professional quality. His best known contribution to science was the popularisation of the Guppy fish that bears his name. Before Guppy, W.C.H. Peters originally discovered this species and catalogued it in Berlin, where it was overlooked. It was Guppy, however, who sent specimens to London, making the fish known to the English-speaking world.

Robert John Lechmere Guppy was born on 15th August, 1836 in London, England. A prodigy from the beginning, he practically taught himself to read at the age of three. As a young man, Guppy wanted to explore the world as a scientist but his uncle wanted him to manage his family's estate in England. At the age of 18, he entered Oxford University but on receiving letters from his uncle begging him to return home, he ran off to Tasmania. He was shipwrecked on the coast of New Zealand in 1856, where he remained among the indigenous Māori people who had rescued him. During that time, he explored the island, mapping the area and collecting specimens. After two years, he joined his parents and brother who had migrated to Trinidad.

Although his family lived in San Fernando, Guppy's job in the government service compelled him to stay in Port-of-Spain. Eventually, his zeal for education led him to being appointed to help organise the education system as the island's first Superintendent of Schools.

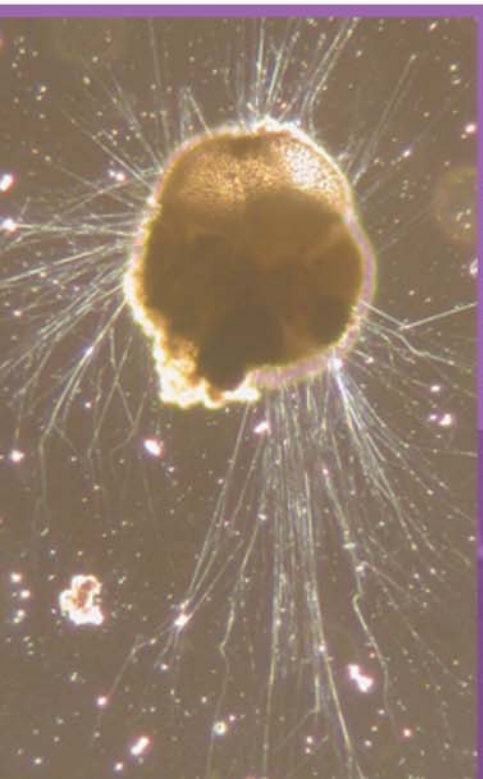
His earliest published scientific papers can be dated back to 1863, when he conducted geological surveys of Trinidad. Guppy collected samples, made notes and wrote papers in

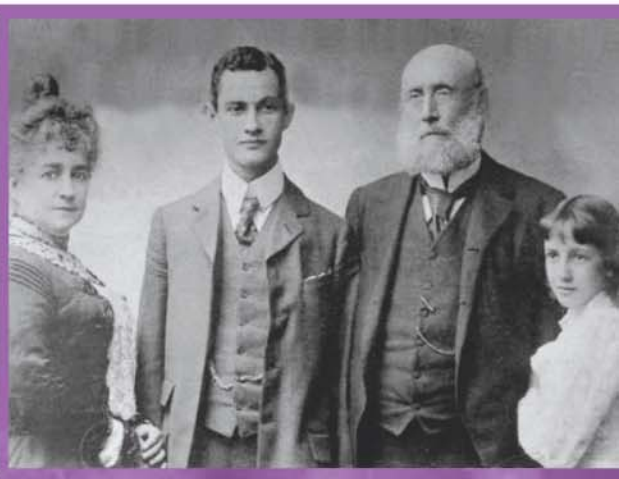
Trinidad and presented his findings in England, North America and in the proceedings of The Trinidad Scientific Association. His 1863 paper on Trinidad fossil foraminifera[2] was one of the earliest such publications in the Western Hemisphere. This, and his subsequent papers on Trinidad's fossil foraminifera were the standard references for the later 20th century micropalaeontological[3] studies which established the value of this group of fossils for dating and correlating petroleum deposits in Trinidad.

During his surveys, he noticed a fish, which was called the "millions fish" at the time, but would later be named the "guppy". Intrigued by the small creature, he sent samples in 1866 to the curator of the British Museum, the legendary ichthyologist[4], Dr Albert Carl Ludwig Gotthilf Guenther. In that same year, Guppy and his brother, Francis founded the *Trinidad Almanack*– a reference book that was eventually taken over by the government as the official yearbook. Guppy was also the founder of the Victoria Institute (now the National Museum) in Port-of-Spain at the time of Queen Victoria's Golden Jubilee in 1887, and he served as the Institute's president for years.

Guppy continued publishing up until his last years. He produced over 30 papers in his lifetime and his scientific work was so in demand that *A reprint of the more inaccessible palaeontological writings of Robert John Lechmere Guppy* was published in the *Bulletins of American Palaeontology* after his death on 5th August, 1916.

*1 – Invertebrate palaeontology is the study of the history and development of spineless multi-cellular animals, conducted by recovering, identifying and studying their fossils*
*2 – Foraminifera are marine micro-organisms with a high rate of reproduction and a detailed fossil record*
*3 – The palaeontology of microscopic organisms*
*4 – Ichthyology is the scientific study of fish*





From Left to Right:

1. Foraminiferan
2. Guppies are popular because of their resilience and fast rate of reproduction
3. Guppy third from left with his family

# Lincoln Hall

## INORGANIC CHEMIST

Professor Lincoln Hall is an internationally recognised chemist who helped put The University of the West Indies (UWI) on the world map. He is best known for his research on squaric acid[1] and its derivative compounds. The most recent, significant application of this research was in the development of a new series of electron-transfer mediators[2] for the American health care company, Abbott Laboratories, which requested his assistance in solving a problem with its blood glucose testing strips.

Lincoln Hall was born on 14th August, 1947 in Siparia, Trinidad. He attended the Siparia Union Canadian Mission School where he excelled, and was skipped three times. After completing Iere High School, he obtained a government teaching scholarship to attend UWI, where he completed his Bachelor of Science (BSc) in Chemistry and Mathematics in 1970 with First Class Honours in Chemistry. He taught at St. George's College, Barataria and simultaneously pursued the Master of Science (MSc) in Inorganic Chemistry at UWI, St. Augustine, which he was awarded in 1974.

In 1978, after a year working at Lever Brothers West Indies Ltd, Hall was appointed Lecturer in Chemistry at UWI. He received his Doctor of Philosophy (PhD) in Analytical Chemistry from UWI, St. Augustine in 1985. In 1992, he was promoted to the rank of Senior Lecturer and Head of the Inorganic Chemistry Department and was promoted again to Professor in 2003.

Professor Hall spent years conducting research on the organic compound, squaric acid. In 1993, he received a Leverhulme Award to conduct research at the Department of Chemistry of the Imperial College, University of London. His research has produced 78 new chemical compounds from squaric acid, all of which are listed in The Cambridge Crystallographic Data Centre database. Professor Hall has been investigating the practical uses of squaric acid derivatives in health and medicine. His focus has been on

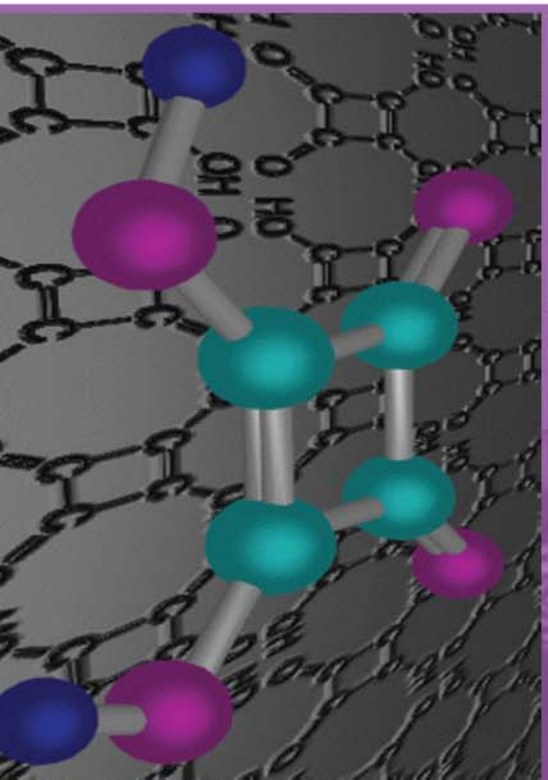
testing for possible applications as mediators, anti-cancer agents and image enhancers in Magnetic Resonance Imagining (MRI). In 2006, he received a research grant from the Principal of the St. Augustine Campus, UWI, for his research on mediators.

Professor Hall has also conducted research on heavy metals[3] pollution in Trinidad and Tobago. He contributed to an Institute of Marine Affairs' study on selected heavy metals in the Gulf of Paria, off the western coast of Trinidad. This study generated eight scientific papers and two national reports between 1986 and 1991. He also assisted in another study which investigated the concentrations of lead in the hair and blood of selected individuals in order to assess the impact of environmental lead.

Throughout his career, Professor Hall supervised several postgraduate students. Thanks to his skilful direction, two of these achieved the Best Thesis Award and received their doctorates with high commendations. In 2003, he received a Dean's award for postgraduate research.

Professor Hall is a member of the Royal Society of Chemistry, the New York Academy of Sciences, the Caribbean Academy of Sciences and the American Chemical Society. His advice to budding scientists is that one should pursue research opportunities wherever they are found, including developed countries where research is funded and rewarded. On 31st August, 2008, Lincoln Hall resigned his professorship at UWI after nearly thirty years of loyal service.

*1 – A compound with square shaped molecules. It is often used as a monomer – a "building block" – in synthesising larger compounds, which may have applications different to squaric acid itself*
*2 – Mediators are crucial in blood glucose testing strips, which diabetics use to monitor their blood glucose levels*
*3 – Metallic elements which are poisonous to living organisms in high concentrations*



From Left to Right:

1. Molecule of squaric acid
2. The Gulf of Paria
3. Hall, middle, with his PhD student Patrice Piggot, as she receives Best Thesis Award 2004

# Fredrick Hardy

## SOIL SCIENTIST

Fredrick Hardy was one of the first scientists in the world to realise the relevance of ecology to agriculture, and he entered the fledgling field of soil science before it was even considered an independent discipline. He conducted soil capability reports for Trinidad and Tobago and a successful Caribbean-wide soil survey. He also educated hundreds of students over three decades and played a major part in establishing the institution that later became the Faculty of Agriculture of The University of the West Indies (UWI).

Fredrick Hardy was born on 31st March, 1889 in England. He attended Bradford Grammar School and later studied natural sciences at Cambridge University. He taught science and agricultural science in Barbados until 1917 and returned to England during World War I to work as a chemist in H.M. Factory in Oldsbury until 1919.

Hardy returned to Cambridge University and obtained a Diploma in Agriculture in 1920. He served as a chemistry demonstrator at the university's School of Agriculture before returning to Barbados to work as the Soil Scientist at the Imperial Department of Agriculture. He was then posted to the Government Laboratory in Antigua to continue his work on soils. Hardy left his post at the laboratory in 1922 to lecture in Trinidad at the West Indian Agricultural College, which would later become the Imperial College of Tropical Agriculture (ICTA). He served as Professor of Chemistry and Soil Science, and Head of the Department of Chemistry and Soil Science at ICTA for three decades until his retirement in 1954.

During his tenure at ICTA, he revolutionised the scope of research at the organisation. While ICTA focused on projects of global application, Professor Hardy focused on regional issues within the newly formed Regional Research Centre (RRC). Studies were funded by the Commonwealth Development and Welfare Fund and the RRC gained an international reputation for excellence.

Professor Hardy used his ingenuity to overcome a lack of resources by conducting simple but important experiments. He wrote a land capability report for Trinidad and Tobago, edited many soil survey reports, and prepared technical guide sheets on land use for Barbados. He also wrote a book-sized review of the work of the Department of Soil Science of UWI covering the first 50 years of its existence. He conducted a Caribbean-wide soil survey and an auxiliary soil research programme, which were noted as the most significant achievements of the RRC and ICTA for many years.

His tremendous output helped to build ICTA's reputation as a world-class institution - a reputation that the Faculty of Agriculture was subsequently able to capitalise on when it was established. In 1956, Professor Hardy served at the Inter-American Institute of Agricultural Sciences in Turrialba, Costa Rica. He returned to Trinidad and Tobago in 1967 and continued his work at UWI.

Professor Hardy was one of only two persons awarded an honorary Associateship of the Imperial College of Tropical Agriculture (AICTA). On 2nd January 1950, the Crown inducted him into the Order of the British Empire as a Commander of the Civil Division. Today, his legacy to the university is immortalised by Hardy Drive which runs through the university housing area, the Frederick Hardy Building which houses agricultural research and teaching, and the Frederick Hardy Prize, which is presented annually to the best final year soil science student.

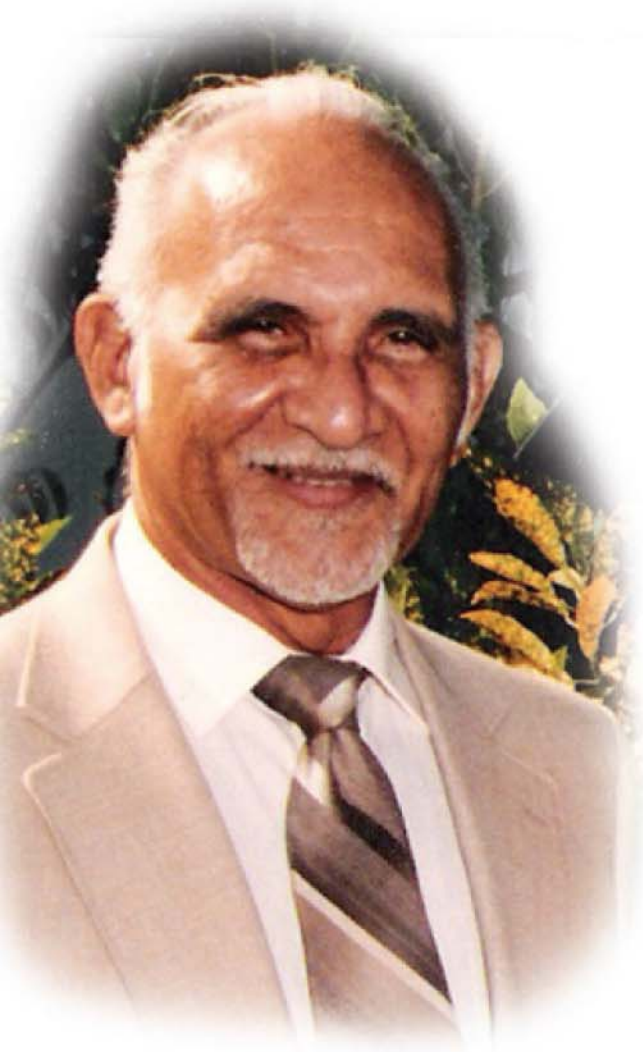
Professor Hardy died on 9th April, 1977.

From Left to Right:

1. UWI soil scientists in the field
2. Tropical soil profile
3. Administration building, UWI, St. Augustine (formerly ICTA building)

# Ignatius Desmond Imbert

## CIVIL ENGINEER



Desmond Imbert, Emeritus Professor of The University of the West Indies (UWI), lectured in civil engineering at UWI, St. Augustine for over 30 years, training hundreds of undergraduate and postgraduate engineers. He is an international authority on concrete technology, having presented numerous papers at foreign and local conferences and formulated concrete mixes for diverse applications and conditions.

Ignatius Desmond Charles Imbert was born on 20th April, 1931 in St. Lucia. During his childhood, he moved first to Dominica in 1937 and then Montserrat in 1942. He attended the Montserrat Secondary School and won the Leeward Islands' Scholarship in 1948. Imbert was an avid sportsman as well as a brilliant student. He was captain of the Montserrat Secondary School football team and vice captain of its cricket team. He also played cricket in Antigua against noted cricketer, Lester Bird.

The family then moved to Trinidad and Imbert spent one year as an Assistant Teacher at Fatima College before proceeding to university. He studied civil engineering at the National University of Ireland where he obtained his bachelor's and master's degrees in this field. His master's project was a paper on West Indian housing construction.

Imbert went on to serve Antigua and Barbuda as a government engineer, and then worked in Barbados at the Public Works Department as the Director. In 1964, he joined the new Department of Civil Engineering at UWI, St. Augustine, as a lecturer. After a brief stay, he entered Trinity College, Dublin University in Ireland, where his study of stress patterns in concrete slabs earned him a doctorate in 1966. That same year, Imbert returned to UWI's Department of Civil Engineering.

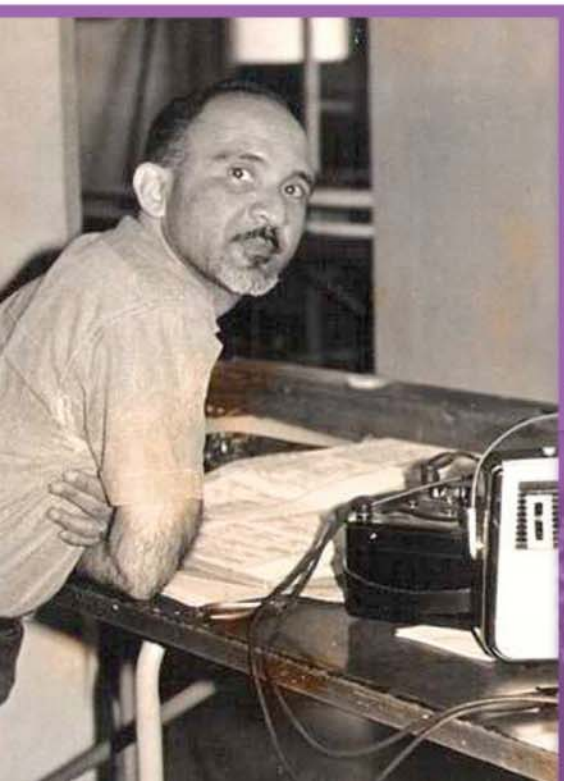
He was appointed Dean in 1974, Professor of Civil Engineering in 1976, and served as Dean until 1983. In 1987, he established postgraduate training programmes in Construction Technology at St. Augustine and directed these programmes for nine years. He also managed the construction of the new UWI Faculty of Engineering building at St. Augustine from 1988 to 1993.

Professor Imbert was a visiting Professor of Construction at the Florida International University from 1989 to 1992 and an acknowledged expert on the effects of hurricanes and on hurricane-resistant structures. As a professional long associated with the National Hurricane Center in Miami, he was an expert witness in assessing damage caused by Hurricane Andrew in Homestead, Miami in 1992.

He made significant contributions to applied research and innovation, investigating the use of St. Lucian pumice as aggregate material, and developing several concrete mixes for use in marine construction. He also worked with Trinidad Clay Products Ltd, now the leading edge company, Alstons Building Enterprises Ltd (ABEL), as a specialist designer of innovative floor systems.

Professor Imbert is a member of the Institution of Engineers of Ireland and the American Society of Civil Engineers. He was made a Fellow of the Association of Professional Engineers in Trinidad and Tobago (APETT) in 1978 and served as its President from 1977 to 1978. He was also an advisor to the Caribbean Development Bank for 10 years.

Outside of academia, he is known for his love of "ole talk" and his propensity to enter into animated discussion on every subject.



From Left to Right:

1. Imbert conducting research at Trinity College engineering lab, 1967
2. Imbert presenting the table tennis champion shield to 1979 Singles Champion CA Bhawanie
3. Imbert on the left with Professor O.Ural from the Florida International University

# Winston Ince

## CARDIOLOGIST

Dr Winston Ince was one of the early local innovators in the field of cardiology. During his illustrious career, he introduced echocardiography[1] to the Port-of-Spain General Hospital and secured free open-heart surgery for children. He has written and published several papers, in regional and international journals, in areas such as cardiology and hypertension.

Winston Edghill Ince was born on 2nd December, 1930 in Tunapuna, Trinidad. He started his education in 1935 under the tutorage of Mr Prince Edgar Ferdinand, Headmaster of the La Brea R.C. School. Mr Ferdinand mentored him, giving him personal lessons free of charge, helping to ensure that Ince won a scholarship to St. Mary's College in 1941. The young student stayed at his grandmother's home in Curepe to facilitate his studies and excelled, receiving an Island Scholarship in Science and the Dr Stollmeyer Medal for Science in 1948.

Ince then left for the United Kingdom in 1949 to study at the University of Cambridge. In 1952, he obtained First Class Honours in the Preliminary to the Natural Science Tripos and won a College Exhibition and the Tripos Prize. In 1953, he obtained a Bachelor of Arts (BA) Natural Science Tripos with First Class Honours and was again awarded the Tripos Prize, along with the title, Scholar of Sidney Sussex College. He entered medical school at University College Hospital, London and graduated with a Bachelor of Medicine and Surgery (MBBChir) from the University of Cambridge in 1956.

He obtained postgraduate diplomas of Membership of the Royal College of Physicians (MRCP), Edinburgh specialising in cardiology in 1960 and the MRCP, London in 1961. He was subsequently elected to the Fellowship of both Royal Colleges.

In 1962, Ince returned to Trinidad and served as Senior Registrar at the Port-of-Spain General Hospital. He went back to London to become a clinical assistant in the Department of Cardiology at the University College Hospital in 1966, and returned to the General Hospital in 1967 as Consultant Physician in Cardiology and Internal Medicine.

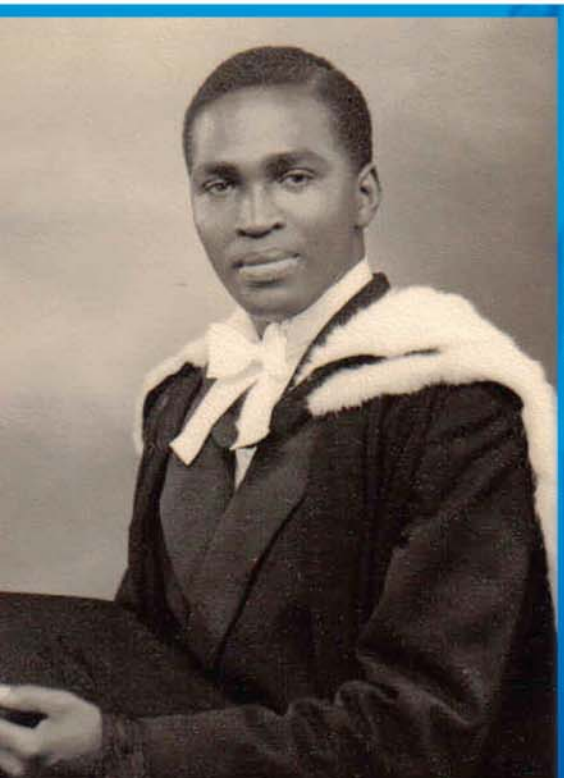
For more than 50 years, Ince's career was focused on clinical medicine, clinical cardiology and teaching medical students in the UWI Eastern Caribbean Medical Scheme. He managed and developed the Paediatric and Adult Cardiology Services for over 25 years and retired from the General Hospital in 1990 as Medical Chief of Staff. He played a significant role in the introduction of echocardiography, which is important in the diagnosis of heart disease.

Despite his retirement, Ince as Honorary Consultant Physician to the hospital, continues to be involved in the training of echocardiographic technicians. The first batch graduated in 2004. He is currently the Chief Medical Officer for an insurance company and also has a private consulting practice in cardiology.

Dr Ince is the recipient of the Chaconia Medal (Gold) in 1989, the Trinidad and Tobago Medical Association Scroll of Honour in 1990, and an honour award from the Caribbean Cardiac Society in 1999.

He advises that young people with scientific aspirations should "always aim at performing to the best of their ability, work hard, read extensively, and seek after truth, wherever it may be found."

*1 – The use of ultrasound to generate images of the heart*



**From Left to Right:**

1. University of Cambridge graduation, 1953
2. Echocardiography at Port-of-Spain General Hospital, 1979
3. Ince far right receiving the Chaconia Medal (Gold) from President Noor Hassanali, 1989

# Noel Kalicharan

## COMPUTER SCIENCE EDUCATOR

Dr Noel Kalicharan joined the St. Augustine Campus of The University of the West Indies (UWI) in 1976. He was the first full-time lecturer in computer science and became the longest serving member of staff there. He shaped the teaching of computer science in Trinidad and Tobago for several decades and authored several internationally recognised computer science books.

Kalicharan was born on 14th November, 1952 in Lengua, Trinidad. He attended Lengua Presbyterian School, participated in "Cubs and Scouts", and organised cricket matches against boys from other villages. In 1963, he placed first in the Presbyterian Teachers' Association Examination, later earning a scholarship to Naparima College.

A well-rounded student, he represented his school in cricket, table tennis and chess, and tied for first place in the country in his O'Level GCE examinations. At the A'Level examinations, Kalicharan won a National Scholarship in Mathematics and the UWI Open Scholarship. He attended UWI, Mona, Jamaica where he attained a First Class Honours Bachelor of Science (BSc) in Special Mathematics, and represented the university in table tennis and cricket.

Graduating in 1973, he won the West Indies Studentship to Trinity College, Cambridge but declined it, instead returning to Trinidad and Tobago to teach mathematics at Naparima College. In 1974, a Canadian Commonwealth Scholarship took him to the University of British Columbia where he pursued his Masters in Computer Science, specialising in programming languages. He worked part-time as a programming tutor to undergraduates, and later edited *The Minicode Users Guide*.

After graduating in 1976, Dr Kalicharan lectured at the Faculty of Engineering and then the Faculty of Natural Sciences, UWI where he introduced new courses in computer science. He was a member of the committee responsible for

formulating the first computer science programme at UWI, in 1979 and has been involved in every revision since.

When Kalicharan began teaching, textbooks were not regularly available so he wrote monographs, technical reports, and manuals for use by students. In 1985, he published the first local book on computer science – *Computer Studies-Fundamental Plus.* Since then, he has written fourteen more books, all of which are highly acclaimed internationally. Dr Kalicharan had taught every computer science graduate of UWI until 1977. He also formulated and presented a 26-episode television series on computer literacy and programming: *Computers – Bit by Bit.*

Dr Kalicharan was Chief Examiner for the National Training Board, NIHERST and the Caribbean Examinations Council (CXC). He also served on the advisory committees that introduced computer science at the secondary and tertiary levels in Trinidad and Tobago. Since 1993, he trained Trinidad and Tobago's candidates for the International Olympiad in Informatics.

Dr Kalicharan has won several prizes for his innovations, namely *Pan Tutor* for teaching music for the pan, and games such as *Brainstorm!* which develops logical thinking and numeracy skills, and *Not Just Luck*, which develops word skills. His other significant projects include a computer system to tabulate results for the 1991 General Elections, another in 1992 to process the results of National Carnival Commission competitions, and a third to calculate target scores in a limited overs cricket match interrupted by rain.

A pioneer in computer science education in Trinidad and Tobago and the wider Caribbean, Noel Kalicharan's contributions in diverse areas have had a lasting impact on the standard and quality of Information Technology locally, regionally and internationally.


From Left to Right:

1. One of Kalicharan's internationally acclaimed books
2. Computer laboratory
3. Kalicharan at work at UWI

# Collingwood Karmody

## OTOLARYNGOLOGIST

Professor Collingwood S. Karmody is an internationally famous otolaryngologist[1] who is noted for his research interests in the pathophysiology[2] of *Otitis Media*[3] , congenital abnormalities of the head and neck, and the histopathology[4] of deafness. He performed a groundbreaking cochlea implantation at the New England Medical Centre, restoring partial hearing to a severely deaf patient. He has published several books and over 130 scientific papers.

Karmody was born on 25th September, 1929 in San Fernando, Trinidad. He attended Coffee Street EC School and Naparima College before transferring to St. Mary's College, which he attended from 1944 to 1948. He studied medicine at the University College, Dublin (now the National University of Ireland) where he won the Ambrose-Birmingham Gold Medal and received his Bachelor of Medicine, Bachelor of Surgery and Bachelor of Obstetrics (MB BCh BAO) in 1955. After graduation, he continued his career at the Royal College of Surgeons in Ireland, the Institute of Laryngology[5] and Otology[6] of the University of London, the Royal College of Surgeons of Edinburgh, Harvard University as Fellow in the Faculty of Medicine, and the University of Vermont. He became a Fellow of the Royal College of Surgeons of Edinburgh in 1960.

As Consultant Surgeon to the Government of Trinidad and Tobago between 1961 and 1965, he conducted a *Study of Maternal Rubella*[7] and *Congenital Deafness*, demonstrating for the first time the effects of the virus, and the birth defects associated with it, in pregnant women showing no symptoms of illness. He and other researchers also conducted a *Study of the Ethnic Variation in the Incidence of Otitis Media* in Trinidad in 1998.

After emigrating to the United States in 1963, Karmody held many distinguished positions. He was elected Fellow of the American Academy of Otolaryngology - Head and Neck Surgery (AAO-HNS) in 1968 and a Fellow of the American College of Surgeons in 1970. He was Professor of Otolaryngology and served as Interim Chairman of the Department of Otolaryngology at Tufts University School of Medicine and Tufts-New England Medical Center in Boston, Massachusetts.

Professor Karmody was Examiner for the fellowship examinations of the prestigious Royal College of Surgeons, Edinburgh from 1982 to 1989, the American Board of Otolaryngology from 1970 to 1974, and the Faculty of Medical Sciences of The University of the West Indies (UWI) from 2000 to 2005. He held Visiting Professorships at Harvard University, The State University of New York, The University of Vermont, The University of Tennessee, the Medical University of South Carolina and the University of Chile.

He received the Honor Award of the AAO – HNS and was consultant to the Board of Rehabilitation in Massachusetts. In 1999, after 30 years of service, Tufts University appointed him Professor Emeritus.

Professor Karmody authored the *Textbook of Otolaryngology* (1983) and was Guest Editor of *Headache and Facial Pain* (2003). *An Atlas of the Congenital Anomalies of the Neck: Tips on Surgical Management* is in preparation.

In 2005, he and two colleagues identified a new inherited medical syndrome involving early greying, hearing loss and essential tremor[8], which has not yet been named.

*1 – Specialist in the branch of medicine that deals with the diagnosis and treatment of ear, nose and throat disorders and head and neck disorders*
*2 – The study of the changes in body function associated with disease or injury*
*3 – Inflammation (redness and swelling) of the middle ear accompanied by pain, dizziness and impaired hearing*
*4 – The study of diseased cells on a microscopic level*
*5 – The branch of medicine that treats the larynx (voicebox) and upper throat*
*6 – The science of the ear and its related diseases*
*7 – A form of measles that causes mild rashes in adults and birth defects in unborn children*
*8 – The most common tremor disorder, associated with aging. Causes trembling of the hands, arms, head or eyelids of patients who attempt to move these muscles, and of the voice when they try to speak.*

**From Left to Right:**

1. Presenting a paper at a conference
2. Karmody standing second row, second from left at St. Mary's College
3. Karmody back row first from left with some school friends

# Stephen Khan

## MATHEMATICS EDUCATOR

Stephen Khan has been a role model and mentor for students in Winnipeg, Canada for over 31 years. He taught advanced problem-solving techniques and demonstrated how mathematics is linked to other areas like physics, chemistry, and general science. More than two-thirds of his Grade 12 students went on to pursue mathematics, engineering or computer science at university.

Born on 12th June, 1942 in San Fernando, Trinidad, Khan attended Mon Repos R.C. School and Presentation College. He was strongly influenced by his Form Six teachers at Presentation College, who inspired him to pursue his love of photography and music. After teaching science for one year at his alma mater, he moved to Canada where he graduated from the University of Manitoba with degrees in mathematics and physics in 1966, and in education in 1970.

As a mathematics and physics teacher, Stephen Khan made a significant contribution to the field of applied mathematics. His teaching style incorporated hands-on experiments, such as building amplifiers and guitars, which were based on his personal experiences. He allowed his students to explore their interests by incorporating topics such as sports, electronic devices and building rockets into his coursework.

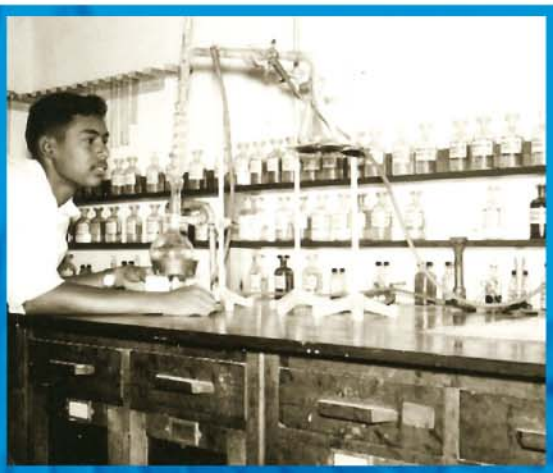
Khan served as a member of the consortium that revised the mathematics curricula for the Western Provinces and the Territories in Canada, and was Chairperson of the Manitoba Applied Mathematics Curriculum Development Committee. He has co-authored three applied mathematics student and resource texts, and conducted hundreds of workshops to train teachers in the use of technology in teaching mathematics. He is also credited for his work in the design of an online web version of an applied mathematics course, and for collaborating in the development and implementation of one of the first computerised administrative and reporting systems for a Canadian high school.

Interestingly, mathematics is not the only subject to which Khan applied his energies and creativity in academia. In 1995, this dynamic and enthusiastic educator created a new programme called *Media Applications*. This innovative course taught students the skills necessary to produce a magazine. It involved researching, interviewing, writing, marketing, as well as learning photography and design skills using several computer programmes.

A man of many talents, Khan also expressed his two lifelong passions as a photographer and a guitarist through the clubs and musical soirees that he organised for his students. He was known for his sense of humour and the respect he showed to his students. His success as a teacher resulted in his nomination for Teacher of the Year Award on five occasions. In 1995, he was the recipient of the highly coveted Prime Minister's Award for Teaching Excellence in Science, Technology, and Mathematics in the province of Manitoba. In 1999, he received the Murray McPherson Award for his contribution to the development of mathematics education in the Manitoba schools. In 1991, he was selected to be an Associate Member of the National Institute, an arm of the non-profit educational organisation, the Canadian Centre for Creative Technology in Waterloo, Canada.

Since his retirement from teaching in 1997, Khan has operated an innovative and successful business in photography using digital and computerised equipment. A professional musician for over 30 years, he finally put aside his guitar to devote all his time to photography.

Stephen Khan uses a quote by Albert Einstein to advise students that; "Logic will get you from A to B. Imagination will take you everywhere."



**From Left to Right:**

1. Young Khan at home in Mon Repos, San Fernando
2. Form Six student at the Chemistry lab in Presentation College
3. An avid photographer with his first SLR camera

# Hans Kugler

## GEOLOGIST

Dr Hans Kugler's devotion to geology and palaeontology[1], the advancement and worldwide promotion of research on Trinidad and the compilation of a Geological Map of Trinidad in 1961, earned him the title "Father of Trinidad Geology". Fifty-one species contain the scientific designation *kugleri* and two genera[2] are named in honour of their discoverer.

Hans Gottfried Kugler was born in Baden, Switzerland on 22nd August, 1893. He was schooled at St. Gallen and the *Untern Realschule*[3], doing field-mapping and fossil collecting for the Natural History Museum of Basel in his spare time. He began tertiary studies in geology at the University of Basel in 1912, coming to Trinidad in November 1913, where he battled malaria and beriberi[4] to aid Dr August Tobler in his mapping exercises for the Central Mining and Investment Corporation of South Africa. Kugler returned to the university in May 1914, completing his Middle Examinations in 1916 and graduating with his Doctor of Philosophy (PhD) in Geology in 1920.

In 1921, Kugler returned to Trinidad where he mapped the "Apex anticline" for the Apex Oil Company, leading to record-breaking yields. He moved on to the Trinidad Petroleum Development Company in 1925, and with his guidance, it too struck oil in Palo Seco. He left the newly prosperous company for the Central Mining and Investment Corporation, which assigned him to work under their subsidiary, North Venezuelan Petroleum. His geological team survived humid jungles to produce detailed maps and discovered the Tucoyo oilfield in 1925 and the Cumarambo field in 1931.

In 1928, Kugler invited Conrad Schlumberger to demonstrate his electrical logging[5] method in Trinidad on behalf of Trinidad Leaseholds Limited (TLL), which became routine oilwell drilling practice. His suggestions led to the establishment of a biostratigraphic[6] laboratory in Pointe-à-Pierre in 1929, after he was appointed Chief Geologist of TLL.

Kugler convinced TLL to publicise its findings at the risk of financial loss, an essential move for the worldwide development of micropalaeontology[7] and oil geology. He sent samples and research materials to be archived in museums around the world, especially the Natural History Museum in Basel.

Also at Kugler's prompting, TLL introduced aerial photo-interpretation to Trinidad in 1936, and built new laboratories. In 1939, Kugler was involved in border settlement negotiations over the ownership of Patos Island and Soldado Rock in the Gulf of Paria and the location of the Trinidad/Venezuela border. The settlement that followed won Trinidad drilling rights in the Gulf of Paria, a drilling zone which later turned out to be extremely productive. He also organised the first Caribbean Geological Conference in 1939.

In 1956, Texaco took over TLL and Kugler departed Trinidad for Switzerland in 1959, leaving behind his masterpiece – a 1:100,000 map of Trinidad that integrated years of geological mapping, research and photo-interpretive data. Officially published in 1961, the map was the geological standard for over 35 years.

Kugler served as Vice President of the Geological Society of America from 1954 to 1955. He was Honorary Game Warden for Trinidad until his departure and he became an Honorary Member of the American Association of Petroleum Geologists in 1968.

At the Museum of Basel, Kugler reorganised collections, planned new exhibitions and established a section for Caribbean geological documentation and research. He aided John Saunders in establishing the Micropalaeontological Reference Collection and continued his research on Trinidad and the Caribbean until his death.

Hans Kugler passed away on 16th December, 1986 at the age of 93. He published 57 papers, more than any geologist in Trinidad and Tobago to date.

*1 – The science of the forms of life existing in former geologic periods, as represented by their fossils*
*2 – The plural of genus, which refers to a collection of species*
*3 – Sixth Form High School*
*4 – A nervous disorder caused by a deficiency of vitamin B1 and which is marked by pain in and paralysis of limbs, and either unnatural thinness or swelling of the body*
*5 – Schlumberger pioneered the use of electrical instruments to measure rock and fluid properties in an oil well, using this data to locate the depth and composition of oil reserves*
*6 – Pertaining to the study and categorisation of rock strata based on their fossil content and distribution*
*7 – The palaeontology of microscopic organisms*

**From Left to Right:**

**1. On Soldado Rock**
**2. A young Kugler at home with his wife Aline**
**3. With a boa constrictor in his garden**

# Colin Laird
## ARCHITECT

Colin Laird has been the sole architect in his architectural firm for 54 years. He has designed over 200 homes including 65 houses for the Maurice Bishop's Government in Grenada and over 200 public and civil buildings, and has restored over 20 heritage buildings throughout the Caribbean and South America. His most significant achievement is the design and completion of Trinidad and Tobago's National Library and Information Systems Authority (NALIS) building in 2002.

Laird was born on 9th April, 1924 in North Shields, England. He attended the Drayton Manor Grammar School where he excelled in mathematics and art. In 1940, while awaiting call-up for war service, he worked on the building of an armament factory where his father was in charge of construction. The teenager may have gone to the building site because of his father, the engineer, but it was the work of the architects that caught his attention.

In 1942, Laird volunteered for the Royal Navy Fleet Air Arm and came to Piarco, Trinidad to complete his training as an aircrewman. He married Trinidadian, Jeanette née Butler in 1944, the day before leaving Trinidad for assignment to the Allied Invasion of Normandy, France. His commission included cross-Channel patrols and service in a merchant aircraft carrier squadron for countering German U-Boat submarines. After demobilisation, he completed a Diploma in Architecture and initially lectured at several tertiary institutions before going to work on the design of many London buildings under Sir Thomas Bennett. Upon winning the Royal Institute of British Architects' top design prize, the Soane Medallion, he was invited to work with the renowned modern architect, Brian O'Rorke, as senior design architect on the Festival of Britain and the National Theatre.

Returning to Trinidad in 1952, he set up his practice and was solely responsible for designing and managing all

projects. He won the Queen's Hall competition in 1956 for his radically modern design with an inverted catenary[1] roof that was extraordinary at that time.

His practice blossomed and he was entrusted with designing and restoring many prominent buildings and open spaces throughout the region. These include the Brian Lara Promenade, Lion House, House of Mr. Biswas, the Holy Trinity Cathedral, the Blood Bank at the Port-of-Spain General Hospital, the Imperial College of Tropical Agriculture, the St. Kitts and Nevis Government House of Assembly, the Dominica Government Building, and the Hasely Crawford Stadium and Jean Pierre Complex. He came first in the Regional Competition for the CARICOM Secretariat headquarters.

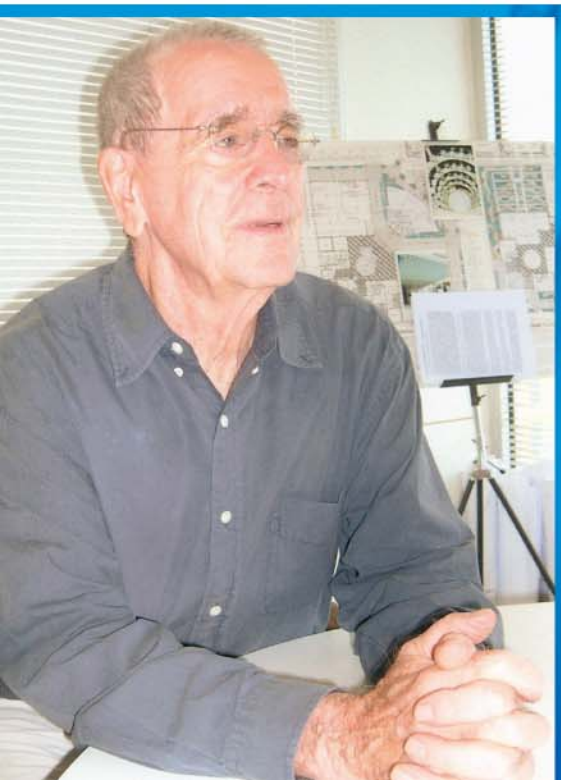
He describes his work on the NALIS building as " 'regional rationalism,' a strictly Caribbean and Trinibagonian expression in light and space encompassing the genus loci of the site - the physical, climatic, historical and cultural aspects." Currently, he is passionately involved in designing green buildings for tropical environments.

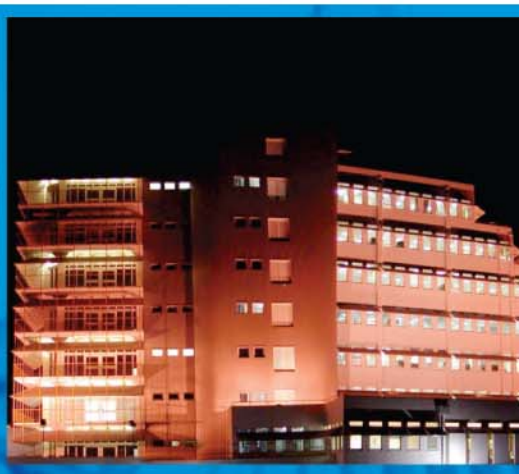
In 1974, Laird was made Honorary Fellow of the American Institute of Architects for esteemed character and distinguished achievements, becoming the first Caribbean architect to gain this honour. In 2001, he received a national award, the Chaconia Medal (Gold) for his outstanding achievements, and the Trinidad and Tobago Institute of Architects President's Gold Medal, which was presented at the first Architectural Design and Excellence Awards in 2005.

In 1984, Laird, an avid sailor, represented Trinidad and Tobago in the famous Observer Single-handed Transatlantic Race (OSTAR) and came third in his class.

To aspiring architects, he professes that; "Architecture is a wonderful profession, in touch with everybody, everything. It cannot ever be boring."

*1 - The inverted catenary design uses complex mathematical calculations to create arches that are distinctive, but purely decorative*





**From Left to Right:**

1. Laird at work
2. Queen's Hall with inverted catenary roof
3. NALIS building, Port-of-Spain

# Arthur Hutton Mc Shine

## OPHTHALMOLOGIST

The Honourable Dr Arthur Hutton McShine was Trinidad and Tobago's first qualified specialist eye surgeon and consultant. A "Renaissance Man"[1], Dr McShine was also passionately involved in politics, economics and education. This humanitarian served his country, especially the nation's poor, for over 40 years.

Arthur Hutton McShine was born on 2nd December, 1876 east of the Dry River in Port-of-Spain, Trinidad. He was educated at Eastern Boys' Government School and obtained a college exhibition to Queen's Royal College in 1888. In 1896, he won an Island Scholarship and elected to study Medicine at University of Edinburgh, Scotland. His nights of studying under the street lamp near his home had paid off!

Within five years, McShine became a prize winning student under the tutelage of the famous Professor Wylie, and attained his primary qualifications in medicine and surgery. He immediately returned to Trinidad where he worked at the General Hospital in Port-of-Spain. He left again in 1902 to pursue postgraduate studies at the Moorfields Eye Hospital in London. In 1903, he completed his thesis on glaucoma at The University of Edinburgh, which qualified him as a Doctor of Medicine (DM), making him the country's first trained specialist in ophthalmology.

He established his own clinic on Frederick Street, and performed free surgery twice a week at the General Hospital. In 1925, he was appointed the first Honorary Ophthalmic Surgeon at the hospital. He also helped to form the Trinidad Association for the Prevention and Treatment of Tuberculosis[2] aimed at improving living conditions in Port-of-Spain to reduce transmission of the infection. He was a member of the Council of the Medical Board for 20 years and served as Vice President and President. Up to a short time before his death, he was the Trinidad Representative on the Editorial Panel of the *West Indian Medical Journal*.

Dr Mc Shine served at the newly-founded Trinidad Co-operative Bank for 32 years, 28 of which he was President of the Board. During these years, the Bank became known as the "Poor Man's Friend", allowing persons with low incomes to participate in its goals of "Thrift and Co-operation". The Bank pioneered low-cost housing in Trinidad and, in his honour, one of its housing settlements in Belmont was named McShine Terrace.

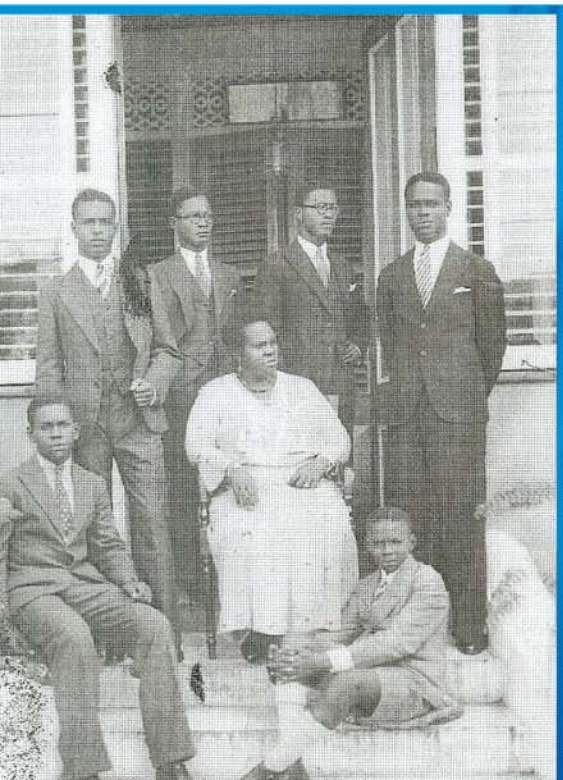
He was a founding member of the Board of Industrial Training which was established in 1931. As Chairman of the Board, he led the establishment, in 1943, of the first full-time technical school, located in San Fernando. Many of the school's graduates entered the petroleum and sugar industries.

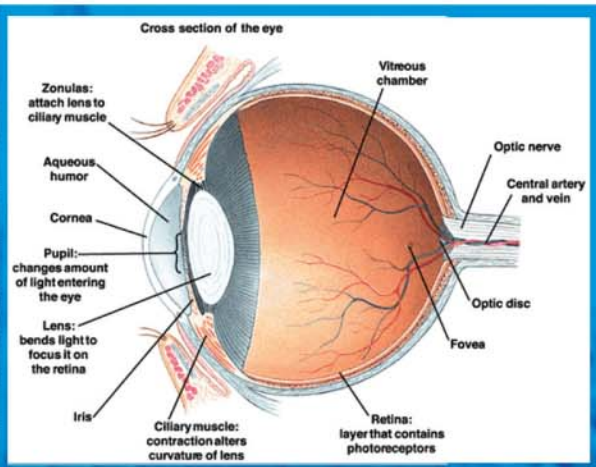
Dr McShine had, however, decided early on that he could best help his country through entry into politics. In 1914, when the City Council of Port-of-Spain was re-established, he was among its first elected members. He was a member of the Council for 14 years, and was elected Mayor from 1921 to 1922 and Deputy Mayor on three occasions between 1920 and 1926. Due to his efforts, a piped water system was installed on Laventille Hill. The McShine Reservoir still services the area today. He also served as an unofficial member of the Legislative Council from 1921 to 1943 and an appointed member of the Executive Council from 1937 to 1943.

Upon retirement, His Majesty, George VI declared that Dr McShine would retain the title "The Honourable". He also received the Order of the British Empire and later the title Commander of the Most Excellent Order of the British Empire.

Dr Arthur McShine died on 4th August, 1948.

*1 - An individual who is highly educated or skilled in multiple areas*
*2 - An infectious and often fatal disease that usually affects the lungs, causing chest pain, coughing, fever and weight loss*



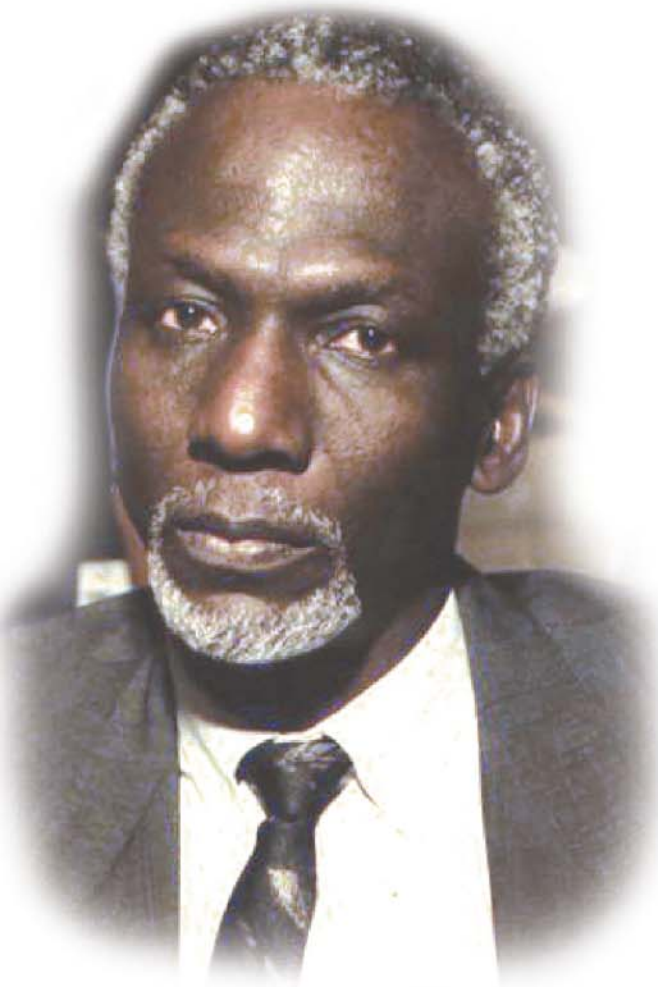



**From Left to Right:**

1. McShine's wife and six sons
2. The cross section of the human eye
3. In his study

# George Norris Melville

## PHYSIOLOGIST



Professor George Norris Melville is an individual with a staggering list of achievements. During his professional life, he has been academician, researcher, diplomat and administrator, but he is best known in Trinidad and Tobago for formulating the proposal that led to the establishment of the Faculty of Medical Sciences of The University of the West Indies (UWI) at Mount Hope. A prolific researcher, Melville has published over 130 referred scientific papers and three books during his distinguished career.

Born in Roxborough, Tobago on 15th December 1939, Melville was educated at Ebenezer Methodist School and Bishop's High School, Tobago. He enjoyed his schooldays, which he shared with his close-knit family and multitude of friends. Melville's natural ability in the sciences, coupled with the fact that his parents both suffered with non-communicable diseases, fuelled his desire to study medicine. It took the loss of his job with the Federal Government, however, to propel him to pursue higher studies in Canada. At the University of Manitoba, Winnipeg, he obtained a Bachelor of Science (BSc) General in 1966, followed by a Master of Science (MSc) in Physiology from Dalhousie University in Halifax in 1968. After a study year in Germany, he travelled to Jamaica to lecture at The University of the West Indies, and pursue his Doctor of Philosophy (PhD) in Physiology, which he completed in 1972.

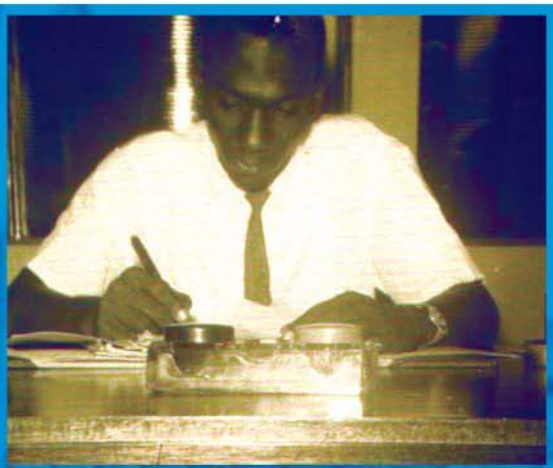
This became a turning point for Melville, who decided to pursue medicine. In that same year, he returned to Germany where he began his medical degree and taught physiology at the University of Essen (now Duisberg-Essen). He also worked at the Silicosis Research Institute, the Herne Medical Centre and Ruhr University. His research focused on the effect of mucus-producing disease on lung function, and he created a model to study the effect of irritants on the respiratory system of animals. By 1977, Melville had

become a Doctor of Medicine (MD) (under the mentoring of Dr Josef Iravani, now deceased), received two substantial research grants and worked on over 40 publications since he first set off for Canada.

In 1978, Dr Melville returned to Jamaica as Professor and Head of the Physiology Department at UWI. He served as Associate Dean and Vice Dean before being called to UWI in Trinidad and Tobago in 1985. Between 1987 and 1988, he served as CARICOM Health Advisor in Guyana and returned to Trinidad and Tobago when the Government accepted his proposal for a self-financing, full-programme medical school. The Faculty of Medical Sciences, St. Augustine emerged in 1989.

After being Vice Dean from 1989 to 1993, Melville became Dean in 1993. His four-year term saw the Faculty earning a large European Union grant to study Health Reform in the Caribbean, and it soon rose as both a sound financial entity and a research-capable institution. During his tenure, the faculty became an international standard for problem-based learning medical schools. Collaborations were initiated with tertiary institutions in India and Malaysia in 1994, a pharmacy programme was opened in 1995 and a clinical training programme began in The Bahamas in 1997.

Professor Melville sat on the Academic Board of UWI for 10 years and served as the Chairman of the Trinidad and Tobago Vision 2020 Sub-Committee on Health. He is currently a member of the North West Regional Health Authority Board and Fellow of both the Caribbean Academy of Sciences and the Academy of Sciences for the Developing World (TWAS).

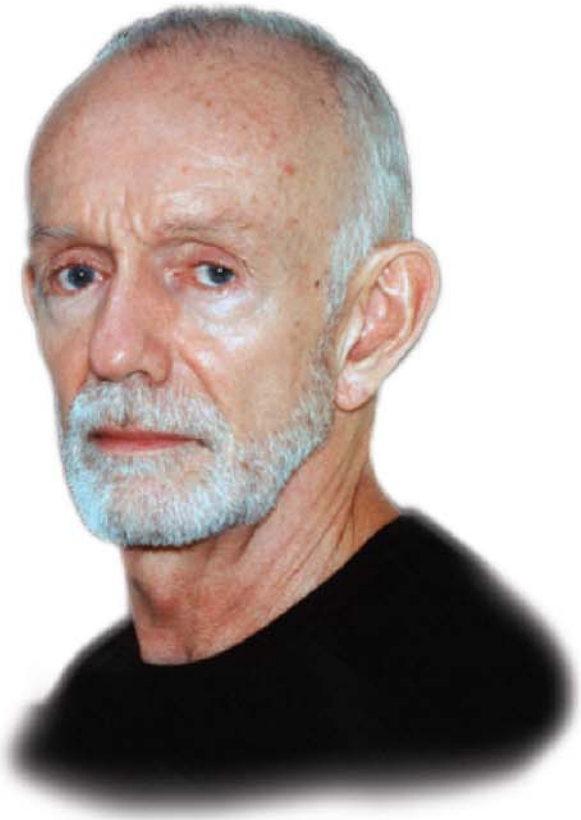



From Left to Right:

1. Melville "liming" in Tobago
2. Recording the results of an experiment
3. Conducting research

# Peter Minshall

## MAS INNOVATOR



Peter Minshall is an artist, designer, artistic director and masman who is renowned for his works of mas for Trinidad carnival and large-scale spectacle events and performances. Much of Minshall's success came as a result of his investigation into the kinetics of the human body in motion and the development of structural techniques to amplify the energy of the masplayer's performance. This has resulted in an array of innovations that continue to have a substantial impact in the Trinidad carnival and in spectacle performance internationally.

Peter Minshall was born in Guyana on 16th July, 1941, and grew up in Trinidad. He attended Queen's Royal College where he became involved with the school's theatre productions and did designing for the Trinidad Light Opera. After high school, he trained in theatre design at the Central School of Art and Design in London, England. He was one of the first to design costumes for the Notting Hill Carnival in London.

As he studied design and was exposed to the world of art and theatre in London, Minshall gradually came to appreciate the value and potency of mas as a form of creative expression. Several opportunities arose for him to design mas in Trinidad, which led to groundbreaking works: the individual *From the Land of the Hummingbird* (1974) and the masband *Paradise Lost* (1976). After a few years dividing his time between London and Port-of-Spain, Minshall returned to Trinidad for good and devoted his full creative attention to the mas. Over the course of three decades, his masbands have embraced diverse themes, each expanding the possibilities of what a mas can be and what it can achieve.

One of his earliest innovations was the articulated bird wing, which allowed for the complete freedom of wing-waving movement and dance seen in his costume *From*

*the Land of the Hummingbird* (1974) and many others. Another signature Minshall structure is the fixed wing attached at the shoulders, often depicting magnificent angel or devil characters. Radial veins give the wings shape, body, and sometimes scalloped feather-like tips as in *Paradise Lost* (1976) and *The Golden Calabash* (1985). Another innovation was attaching elements of the mas structure – ribbons, flags, panels – to the performer's feet, so that they rise and fall with each dancing step, as in *Fire Fire*, from *Paradise Lost* (1976) and *Zodiac* (1978).

As Minshall's kinetically expressive mas creations became more sophisticated and more distinctive, he coined the term "dancing mobile" to classify them. Perhaps the most advanced of these dancing mobiles was the articulated armature that made the foundation of *ManCrab* (1983) and *Callaloo Dancing Tic Tac Toe Down the River* (1984). This structure transmits and amplifies the dancing energy of the mas performer into billowing constructions of fabric and film, high above the performer's head. A subsequent development brought together the technologies of backpacks, foot attachments, hinged arms, and spiral tubes to create a giant dancing puppet that can be motivated by a single performer, reversing the traditional relationship between puppet and puppeteer. The most famous of these were *TanTan* and *SagaBoy* (1990).

At the international level, Minshall played a major role in the design and artistic direction of the opening ceremonies of the Summer Olympics in 1992 and 1996, and the 2002 Winter Olympics, among other major spectacle events.

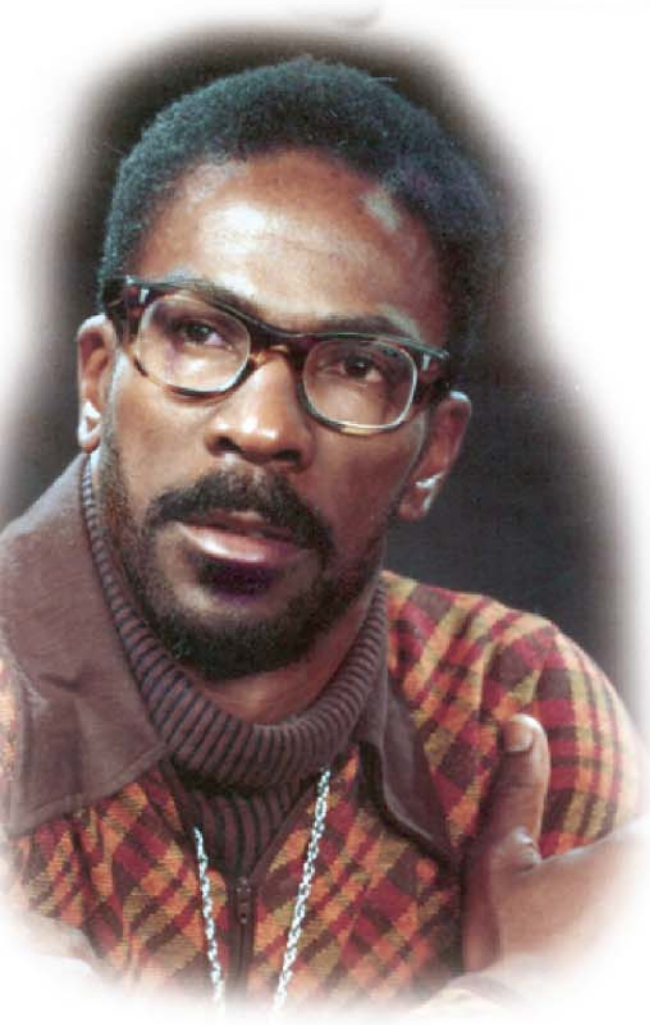
He has received numerous awards for his achievements, among them: a Guggenheim Fellowship (1982); an honorary doctorate from the University of the West Indies (1991); the Trinity Cross (1996); and an Emmy for the Opening Ceremony of the 2002 Olympic Winter Games.

**From Left to Right:**

1. Articulated wings seen in *From the Land of the Hummingbird* (1974)
2. *The Midnight Robber* (1980), one of Minshall's dancing mobiles
3. Minshall at work

# Cyril Lennox Moore

## NEUROLOGIST



Professor Cyril Lennox Moore became a recognisable name at the famous Albert Einstein College of Medicine, the university with the largest postgraduate medical training programme in the United States of America. He was also a founding faculty member at the Morehouse School of Medicine and a pioneer in mitochondrial research[1] before it became an established field of study.

Moore was born on 14th February, 1928 in Tunapuna, Trinidad. He received his primary education at Tunapuna E.C. School and went on to Queen's Royal College. After leaving secondary school, he worked with the postal service as a clerk until 1950, when he immigrated to the United States to further his studies. He completed his Bachelor of Arts (BA) in Chemistry at Brooklyn College, New York in 1953. After graduating, he was called to serve the United States Army but received an honourable discharge due to disability, and proceeded to pursue his Master of Arts (MA) in Chemistry at Brooklyn College in 1958.

In 1964, Moore obtained his doctorate (PhD) in Neurology and Biology from the Albert Einstein College of Medicine in New York, specialising in cellular energy production in the nervous system. He pursued his post-doctorate studies at the Johnson Foundation at the University of Pennsylvania in Philadelphia. There, he contributed to an internationally famous study on the antibiotic valinomycin[2], showing that it forced mitochondria to absorb potassium rather than power the cell. He returned to the Albert Einstein College in 1965 to serve as Instructor, rising to Fellow and finally becoming Assistant Professor of Neurology and Biochemistry until 1970, when he left for Texas.

After spending three years as Professor of Biochemistry and Pediatrics at the Medical Branch of the University of Texas, Galveston, Moore returned to the Albert Einstein College of Medicine as Associate Professor of Neurology, Biochemistry and Neuroscience and Professor of Biology and the

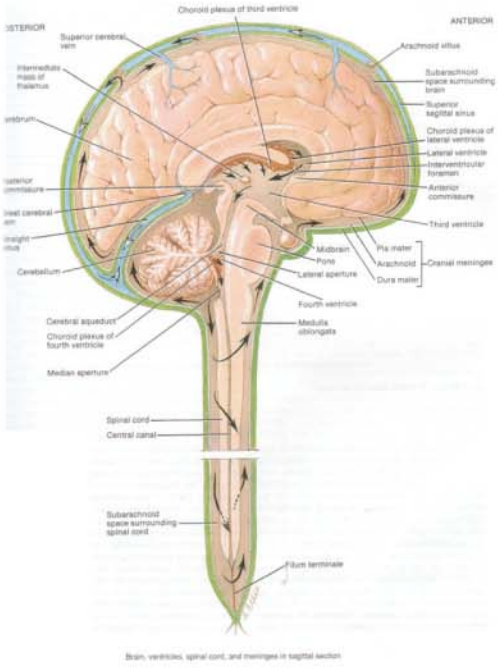
Biomedical Programme. In 1972, a post-doctoral trainee under his supervision, Wendy Cammer, discovered that the liquid cleanser pHisoHex was harmful. The chemical, which had previously been used in new-born nurseries, caused mitochondria to take up oxygen without producing adenosine triphosphate[3] (ATP) essentially starving the brain's cells to death. Dr Moore also conducted research on the obscure Zellweger's syndrome[4] and mentored many up-and-coming neurologists during his time at the College.

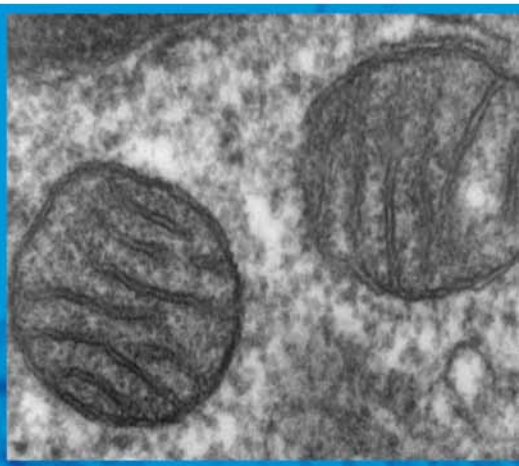
In 1976, he relocated to the Morehouse School of Medicine in Atlanta. He was a highly esteemed Professor and Chairman of the Biochemistry Department until his retirement in 1999. On the 12th February 2000, the Cyril L. Moore Scholarship for medical students was created at Morehouse as a testament to his dedication to education and the great respect that he commanded from his peers at that institution.

Professor Moore served on many state boards, advisory boards and academic council committees including the American Chemical Society, the Beta Kappa Chi (Biology Honor Society), the National Organization of Black Chemists and Chemical Engineers, the Alpha Kappa Alpha Biology Honor Society and the Alpha Omega Alpha Medical Honor Society. He also authored numerous books, articles and other publications, and was a highly regarded speaker.

Professor Cyril Moore passed away on 22nd February, 2006 at the age of 76.

*1 - The mitochondrion is a cellular structure that serves as the centre of energy production and the producer of ATP in the cell*
*2 - This chemical is no longer an antibiotic. Now classified as hazardous, it is used as an insecticide*
*3 - Cells synthesise ATP molecules to store energy and break ATP molecules down to release energy*
*4 - Zellweger's syndrome is a rare disorder marked by the reduction or absence of the cellular structures that rid the body of toxic substances in the liver, kidneys and brain*



**From Left to Right:**

**1. Diagram of the brain and upper spinal cord**
**2. Albert Einstein University**
**3. Mitochondrion micrograph**

# Gaston Lennox Pawan

## BIOCHEMIST

Dr Gaston Pawan was an outstanding medical researcher and educator. An expert on nutrition, metabolism and obesity, he published 143 papers in prestigious medical and scientific journals and lectured worldwide. He was the first to isolate the Fat Mobilising Substance[1] (FMS) and to show (on himself) the biological activity of aldosterone[2]. He studied the metabolic response of the first patient treated with aldosterone in 1954. Breaking new grounds, he studied the first obese human subjects to receive a course of treatment with FMS in 1968. Other published research explored aspects of nutrition and metabolism in relation to endocrinology[3], nephrology[4], pharmacology[5], alcohol and anorexia nervosa. Dr Robert Atkins made use of Pawan's research when developing his famous and controversial Atkins Diet[6].

Gaston Lennox Stephen Pawan was born on 2nd January 1921, the only son of the renowned Dr Joseph Lennox Pawan. He was educated at St. Mary's College, where he was inspired by Fr. Leonard Graf and excelled academically. He was also a noted sportsman in cricket, boxing and weightlifting. In 1939, he joined the Colonial Service as a trainee, assisting in food and drugs analysis. From 1942 to 1944, he was engaged in active war service in the Atlantic. His ship was torpedoed and he was one of only three from the crew of 80 to survive.

In 1945, Pawan went off to England to pursue his higher education. In 1948, he began at the Medical Unit, Middlesex Hospital in London as a research assistant under the direction of Professor Alan Kekwick. He studied part-time at the School of Clinical Medicine at the University of Cambridge, obtaining his Bachelor of Medicine and Surgery (MBBChir) in 1949, and in 1951 a Bachelor of Science (BSc) in Chemistry, Physiology and Anatomy from the University of London. His research focused on metabolic and nutritional disorders. In 1957, he received a PhD in Medicine from the University of Cambridge for *Metabolic Studies in Obesity*, a work that is still amongst the most widely used in the world.

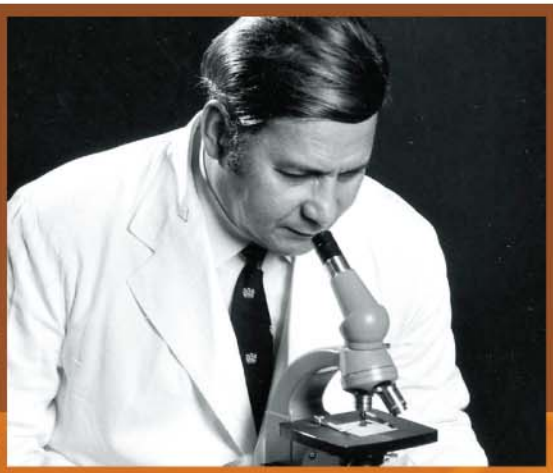
While in London, he was appointed Lecturer and Research Biochemist in the Department of Medicine at the Middlesex Hospital, a centre of excellence in clinical biochemistry at the time. In 1953, he was a founding member of the Association of Clinical Biochemists, one of the first organisations of its kind in the world. In 1955, he became an Honorary Lecturer and Consultant at the Middlesex Hospital Medical School.

Dr Pawan was a Chartered Chemist and fellow of many learned societies and professional institutions including the Royal College of Pathologists, the Royal Institute of Chemistry, the Institute of Biology, The Royal Society of Medicine and the Institute of Food Science and Technology.

In 1968, he was awarded the Doctor of Science (DSc) degree from the University of London for his work in the field of human and experimental metabolism. He was also a recognised teacher in medicine and nutrition at the university, a member of both the Board of Studies in Medicine and the Board of Nutrition and Food Science and its Higher Degrees Sub-committee.

He achieved the rank of Senior Lecturer in Metabolism and Head of the Metabolic Division in the Department of Medicine at the Middlesex Hospital. Dr Pawan retired in 1983, but continued work as an independent consultant. He died on 7th February, 2003.

*1 – A substance released by the body during times of food deprivation, which breaks fat down into its component molecules*
*2 – Aldosterone is a hormone that governs sodium re-absorption and potassium excretion in the kidneys*
*3 – The study of the endocrine system, which delivers hormones throughout the body to carry messages from one organ to another*
*4 – The study of the function and diseases of the kidney*
*5 – The science dealing with the uses, preparations and effects of drugs*
*6 – A low carbohydrate diet involving the consumption of large quantities of protein, which relies on internal chemical processes to cause weight loss*



**From Left to Right:**

**1. Pawan standing outside Emmanuel College, University of Cambridge**
**2. Pawan at work**
**3. Enjoying a meal with his wife Anne**

# Harry Phelps

## CIVIL ENGINEER

Professor Harry Phelps has made lasting contributions to the development and evolution of the Faculty of Engineering at The University of the West Indies (UWI) and to the engineering profession as a whole.

Harry Orville Phelps was born on 4th February, 1929 in Belmont, Trinidad. He received his primary education at Belmont Intermediate School and won a Government scholarship to Queen's Royal College (QRC) in 1940. He graduated at the top of his class in the Science Group of the Higher School Certificate Examinations, earning a Colonial Development and Welfare Scholarship to read for a degree in civil engineering at the University of Wales (Swansea), United Kingdom in 1949. He graduated with First Class Honours in 1953 and returned to Trinidad.

A keen sportsman, Phelps was adept at football and an excellent sprinter. He was a member of the football team at QRC and his university. He even represented Trinidad in 1948 as part of the "19 and under" football team that played against Haiti. In 1947, he was champion sprinter at QRC and a member of the QRC relay team that won the National 19 and Under Championship in that year. Despite his love of sports, he gave up these activities in 1955 to concentrate on a career in academia.

In the 1950s, he held the post of Assistant Drainage Engineer in the Drainage Division, Works and Hydraulics Department, where he was responsible for the design and construction of major drainage works and attained the status of a full professional engineer. In 1961, just as he was promoted to the post of Chief Drainage Engineer, the opportunity arose to teach at the newly established UWI's Faculty of Engineering.

Phelps proved invaluable to the faculty, especially during its genesis. He was one of its first appointees, heavily involved with the construction of the faculty's buildings. He was promoted to Senior Lecturer in 1970 and later to Professor in 1974. Professor Phelps was Head of the Department of Civil Engineering for 12 years, from 1972 to 1994 and, upon reaching retirement age, was made Professor Emeritus in 1995. He also served as the University's Public Orator for 20 years, from 1974 to1994.

As a result of his competence and expertise, Professor Phelps has served as chairman of many statutory boards, including the Institute of Marine Affairs and the Bureau of Standards. He was Deputy Chairman of the Water and Sewerage Authority and a Member of the Board of the Trinidad and Tobago Electricity Commission. He is a Foundation Member of the Association of Professional Engineers of Trinidad and Tobago, serving as President in the 1970s, and is a Fellow of this Association and of the Institution of Civil Engineers in the United Kingdom.

In 1979, Professor Phelps was awarded the Chaconia Medal (Gold) for long and meritorious service to the Republic of Trinidad and Tobago in the sphere of engineering. He also received the Cooper Bronze Medal from the Institution of Civil Engineers for research in fluid mechanics.

Today, Professor Phelps still lectures in the Master's Programme in Environmental Engineering at UWI, St. Augustine.

From Left to Right:

1. Phelps receiving an award from former President Noor Hassanali, 1994
2. A drainage structure in Trinidad
3. QRC football team, Phelps front row, far right

# Wordsworth Price

## PHYSICIST

Professor Wordsworth Price is a multi-talented individual who dedicated his life to physics and electrical engineering, doing extensive work on dielectrics[1]. He was given honourable mention in *Who's Who of British Scientists* (1980 - 1981) and the *International Book of Honour* (1984).

Wordsworth "Wordy" Price was born on 10th August, 1930, in Port-of-Spain, Trinidad. After attending Tranquillity Boys' Intermediate School, he won a Government Exhibition scholarship to Queen's Royal College (QRC). There, Price passed the Higher School Certificate three times in different mixes of the science subjects. Immediately after leaving QRC in 1949, he worked at the Colonial Microbiological Research Institute in Port-of-Spain as a laboratory assistant.

He then won a scholarship to United British Oilfields of Trinidad (UBOT), where he was one of two locals selected for entry to the senior staff. While at UBOT, the news came that he had won a scholarship to the University College of the West Indies (UCWI), now UWI, Jamaica and Price left Trinidad in 1950.

At university, Price completed a Bachelor of Science (BSc) in Physics, Chemistry and Pure Mathematics in 1954. He began his Masters in Experimental Physics in Jamaica, researching the dielectric properties of sapphire, but left in 1957 to continue the degree in England. Later that year, Price took up the post of Experimental Officer at the British Electrical and Allied Industries Research Association (ERA) where he did work on the intrinsic electric strength of polythene[2]. In 1959, Price left the ERA to work as a scientific officer at British Dielectric Research Ltd where he conducted research for the Atomic Weapons Research Establishment, developed micro-miniature capacitors[3] for the Royal Radar Establishment, and sintered[4] tantalum[5] capacitors for commercial use. Price went on to gain a Doctor of Philosophy (PhD) in Theoretical Physics from the University of London in

1971, conducting research on the electric potential[6] theory. He also discovered a mathematical theorem in infinite products[7], which was published in the *Proceedings of the Cambridge Philosophical Society* (1974).

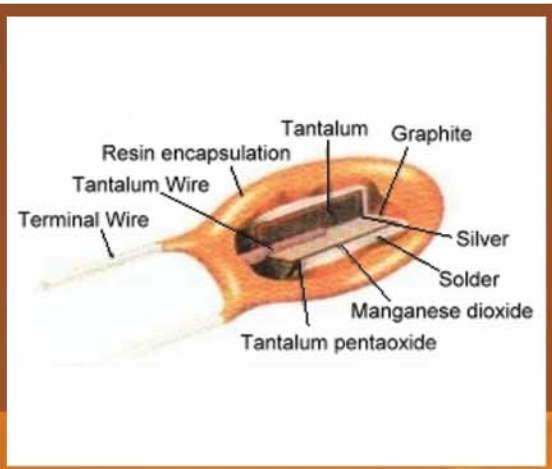
In 1963, Price left British Dielectric Research Ltd to lecture in physics at Norwood Technical College. He subsequently became a senior lecturer in physics and electrical engineering at what is now South Bank University. After his retirement in 1995, he taught Statistics for Business and Economics at Schiller International University and attained the title of Professor.

Professor Price has achieved excellence in extracurricular pursuits as well; he plays the violin in the Kensington Philharmonic Orchestra and has represented Trinidad and Tobago in target-rifle shooting with success at Bisley on many occasions. In 2005, he won the bronze medal in the 300-metre target-rifle event at the World Masters Games in Edmonton, Canada. He is also a member of the English Bridge Union with the rank of Premier Regional Master.

His achievements as a research scientist were recognised in 1990 when he was given the Scarlet Ibis Award for outstanding achievement by the then High Commissioner for Trinidad and Tobago in London, Justice Ulric Cross.

To youngsters considering a career in science, Professor Price advises that; "The best reason for doing science is because you like it and you enjoy doing it."

*1 - Also known as electric insulators, these materials resist electricity. Examples include rubber and glass.*
*2 - A plastic resistant to chemicals and moisture, used extensively in containers, electrical insulation, and packaging*
*3 - An electrical device that can be used to store electrical energy*
*4 - A method of making objects from powder by heating the material until the particles stick together*
*5 - A rare, metallic element that is widely used in capacitors because it readily forms a protective oxide layer which has highly desirable dielectric properties*
*6 - In potential theory this term refers to a mathematical quantity that is used to calculate the strength and direction of an electric field*
*7 - Calculated by multiplying all the terms in an infinite series, for example 0.1 x 0.01 x 0.001 x 0.0001…*



**From Left to Right:**

1. **Receiving QRC Cadet Cup in 1947**
2. **Labelled diagram of a tantalum capacitor**
3. **Price, centre, with his wife Sheila, right and a friend, left, just before playing with the Kensington Philharmonic Orchestra at the Cadogan Hall, London**

# George Maxwell Richards

## CHEMICAL ENGINEER

The President of the Republic of Trinidad and Tobago, His Excellency Professor George Maxwell Richards TC, CMT, PhD, is a distinguished academic in the field of chemical engineering and an Honorary Fellow of the world-renowned Institution of Chemical Engineers of the United Kingdom.

He was born in San Fernando, Trinidad on 1st December, 1931 and received his primary education at the San Fernando EC School, where he won a Government Exhibition scholarship to Queen's Royal College in Port-of-Spain. He obtained his Bachelor of Science (BSc) and Master of Science (MSc) in Chemical Engineering at the University of Manchester in 1955 and 1957 respectfully. He later obtained his doctorate at the University of Cambridge in 1963.

He entered the world of work in 1950 as a Staff Trainee at the United British Oilfields of Trinidad Ltd, a precursor to Shell Trinidad Ltd. Then, as a young graduate, he gained professional experience in the petroleum industry, working in several managerial positions at Shell Trinidad Ltd. He left in 1965 to pursue a career in academia at The University of the West Indies (UWI), St. Augustine. He served as Senior Lecturer and Head of the Department of Chemical Engineering, and then Dean of the Faculty of Engineering, before ascending to the ranks of Deputy Principal, Acting Principal, Pro-Vice Chancellor and finally, Principal in 1985. He held this position until November 1996.

In both his academic and administrative capacities, Professor Richards played a vital role in the development of the university's recognised capability in engineering, a legacy which lives on today. He was one of the pioneers who built the Department of Chemical Engineering, establishing strong links with the Institution of Chemical Engineers and ensuring that the department's programmes were internationally accredited. This was, at the time, a unique

distinction for a university in a developing country. He developed the department's capability in process industries, which has benefited Trinidad and Tobago and the region economically. Thanks to his vision and contribution, the Faculty of Engineering became a world-class centre of excellence whose graduates are in leadership positions throughout the region and abroad. In addition to these achievements, Professor Richards also offered his expertise to the boards of several key service organisations, and private and public companies and institutions.

In 2003, Professor Richards was elected President of the Republic of Trinidad and Tobago. He has also retained an honorary role in academia, having been appointed Chancellor of The University of Trinidad and Tobago (UTT) in 2005. Professor Richards is the recipient of two of the country's national awards – the Chaconia Medal (Gold) and the highest, the Trinity Cross - which were bestowed upon him in 1977 and 2003 respectively, in recognition of his outstanding achievements.

The University of Manchester Institute of Science and Technology (UMIST) named him Alumnus of the Year 2003. Later that year, he also received the Certificate of Honorary Fellowship from the Institution of Chemical Engineers in recognition of the distinction he brought to the chemical engineering profession. He was elected to an Honorary Fellowship at Pembroke College, the University of Cambridge in 2004, and the degree of Doctor of Letters was conferred on him by the University of Sheffield in 2005.

From Left to Right:

1. President Richards at ceremonial opening of Parliament, 2005
2. President Richards greeting youngsters
3. President Richards at UWI graduation ceremony

# John Saunders

## GEOLOGIST

John Saunders has made a great and lasting contribution to the study of the micropalaeontology and geology of Trinidad and Tobago. His pioneering work helped to develop the energy industry in this country. He also embarked on oceanic expeditions and braved the forests of the Caribbean and South America to collect samples and conduct research on the geology of the region. Saunders' papers and excursion guides raised the profile of the Lesser Antilles, playing a part in making it the best-studied accretionary prism[1] in the world at that time.

John Baverstock Saunders was born on 3rd November, 1928 in Essex, England. He attended Tiffins Boys' School in Kingston-upon-Thames. He earned a County Scholarship to University College London and graduated with an honours degree in geology in 1951, specialising in palaeontology and stratigraphy[2].

In 1951, Trinidad Leaseholds Ltd (later obtained by Texaco) employed him as a palaeontologist and field geologist at Barrackpore, transferring him in 1952 to the Geological Laboratory in Pointe-a-Pierre, where he met the "Father of Trinidad Geology", Dr Hans Kugler. With Kugler as his mentor, Saunders zealously took part in every geological mapping and oil-finding excursion possible, even after his 1958 promotion to Senior Statigrapher. After Kugler's departure in 1959, he filled the role of mentor to many junior geologists and micropalaeontologists who drew from his experience in the field. Between 1964 and 1965, Saunders was the Technical Secretary of the Fourth Caribbean Geological Conference and, in 1968, he joined the Standing Committee that successfully maintains the Conference's continuity to the present day.

In 1966, Saunders led the Canadian research vessel Hudson on excursions in Trinidad and Tobago and Barbados. He taught a *Geology for Engineers* course at The University of the West Indies, St. Augustine between 1968 and 1970. He was promoted to Chief Stratigrapher for Texaco Latin America and Trinidad and Tobago in 1969 and was Chairman of the Trinidad and Tobago Branch of

the Institute of Petroleum from 1970 to 1975. In 1975, he spent a two-month period as Co-Chief Scientist for the Deep Sea Drilling Project Glomar Challenger Leg 15 Survey, which was vital in clarifying the plate tectonics[3] of the Caribbean.

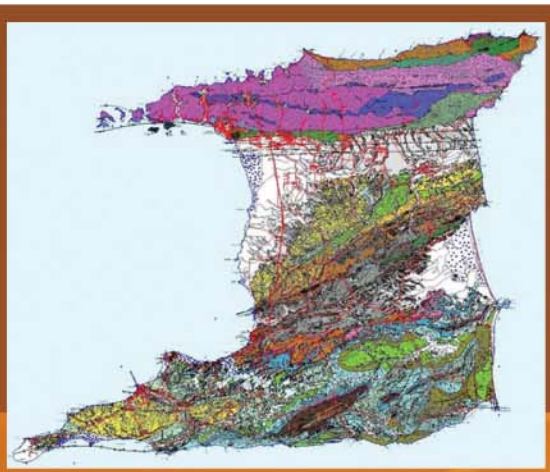
In 1975, Saunders became the Curator of Micropaleontology at the Natural History Museum of Basel, Switzerland, where Kugler had promoted the archiving of Caribbean research since 1959. Saunders co-established the Micropalaeontological Reference Collection, which today contains tens of thousands of international geological specimens. Between 1978 and 1980, he led government-funded expeditions into the Dominican Republic. He contributed to and co-edited *Plankton Stratigraphy* in 1985, *and Benthic Foraminiferal Biostratigraphy of the South Caribbean in 1995*, milestone works involving well-known experts from around the world. Saunders retired from the Museum in 1994.

While in Trinidad, Saunders was an ornithology enthusiast and member of the Trinidad Field Naturalists' Club. He lectured to schools on its behalf and was honorary Game Warden for Trinidad and Tobago from 1960 to 1975. He also recorded the first sighting of the snakebird raising a brood in Trinidad in 1996. His skills at piloting allowed him to contribute aerial photos to Richard ffrench's *Birds of Trinidad and Tobago* and also to extensively document and photograph most of Trinidad's mud volcanoes– both on and offshore.

He produced a stratigraphic lexicon for Trinidad and Tobago, updated the Geological Map of Trinidad prepared by Kugler, and coordinated the Steering Committee for the Ministry of Energy and Energy Industries, which issued the Map in 1998.

John Saunders is an honorary member of the Geological Society of Trinidad and Tobago.

*1– When two oceanic plates collide (see plate tectonics, definition 3), one may be forced under the other. Debris from the lower plate, produced by the scraping of the plates, collects into a pile. As it grows, this pile of debris forms a ridge called an accretionary prism.*
*2 – The study of the origin, composition, distribution and succession of geological strata (layers of rock)*
*3 – The theory that describes the earth's surface as divided into flat sections called "plates" which float on a sea of molten rock called the mantle. When these plates make contact, earthquakes and volcanoes may erupt.*

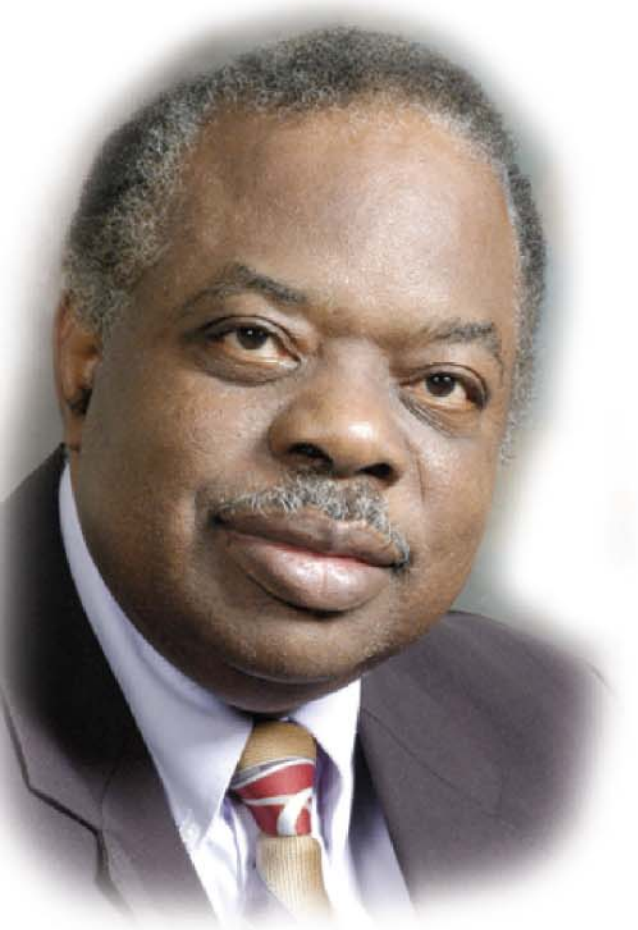


**From Left to Right:**

1. TLL Geological Laboratory, Pointe-a-Pierre
2. 1998 edition of the Geological Map of Trinidad
3. Glomar Challenger research vessel

# Ramsey Saunders

## PHYSICIST



Professor Ramsey Saunders is a physicist, internationally recognised as both a research scientist and an educator. He introduced the world's first undergraduate Medical Physics programme at The University of the West Indies (UWI), St. Augustine, and developed materials sciences, medical physics, bioengineering and environmental physics as disciplines in the Department of Physics.

Ramsey Saunders was born on 29th November, 1945 in Arima, Trinidad. He attended Arima Boys' Government School and won a Government Exhibition to St. Mary's College, where he excelled under Fr. Ivan Galt's tutelage. He attended UWI, St. Augustine, Trinidad and Tobago and in 1968 finished his Bachelor of Science (BSc) in Physics and Chemistry with First Class Honours. He won a Commonwealth Scholarship to the Imperial College of Science and Technology in London. There, he obtained both a Diploma and his Doctor of Philosophy (PhD) in Applied Optics in 1969 and 1971 respectively. This was followed by an Alexander von Humboldt Fellowship at the *Physiologisches Institut*[1] at the *Freie Universitat Berlin*[2].

With the Institute's Applied Optics Group, he produced the first electrophysiological[3] proof of Maxwell's colour theory[4]. He invented a spectral energy machine[5], which was used in Berlin for two decades after he left. He was also Senior Scientist at the *Universitat* under the auspices of the *Deutsche Forschungsgemeinschaft*[6].

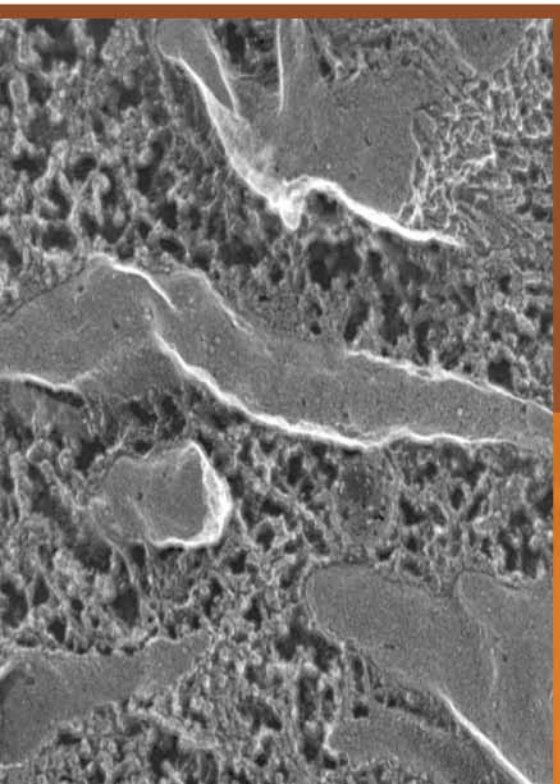
In 1978, Saunders returned to Trinidad and Tobago and became Professor of Physics at UWI. As Head of the Physics Department and later Dean of the Faculty of Natural Sciences, he championed new curricula and spearheaded research projects in several disciplines. He supervised research to improve the process of the drying of local timbers. He used graphite waste to produce pencils, dry cell batteries and a lubricant superior to any available at that time. He initiated work on asphalt and the university's Asphalt Research Group produced 12 commercially relevant products.

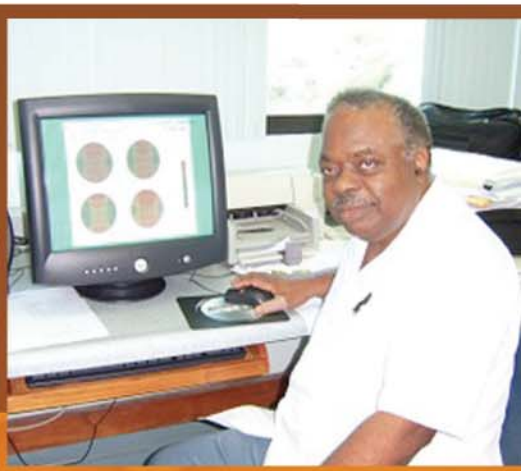
Professor Saunders also studied the effects of noise pollution and helped introduce Superconducting Quantum Interference Devices (SQUIDS)[7] locally for the diagnosis of cardiac problems. He patented a cream that improved scoliosis[8] screening and he designed a device to provide daytime lighting using solar energy. He was part of the international research group that, in 2004, was the first to replicate the nano-plaques[9] of Alzheimer's disease, a significant development in finding treatment. He was also the group-leader of another research team working on water disinfection using solar energy.

He served as a founding member of the Caribbean Academy of Sciences, Chairman of the Board of Governors of the Institute of Marine Affairs in Trinidad and Tobago, and a member of the Nobel Committee for Physics, even being invited to make nominations for the Nobel Prize in Physics on three occasions.

In 2005, Professor Saunders received the Pinnacle Award for Sustained Achievement in Pure and Applied Physics from the National Coalition On Caribbean Affairs (NCOCA) in Washington DC. To students considering a career in science, Professor Saunders advises; "The sky is the limit for any individual once he or she can identify an area of interest."

*1 - Institute of Physiology*
*2 - Free University of Berlin*
*3 - Electric activity associated with a bodily part or function*
*4 - James Clerk Maxwell confirmed the existence of primary colours and did work on colour-blindness, proving that it was caused by blindness to red light only*
*5 - Spectrometers analyse and record electromagnetic waves*
*6 - German Research Partnership*
*7 - Devices used to measure extremely small magnetic fields*
*8 - A medical condition involving severe deformity of the spine's curvature. It can be present at birth, develop spontaneously or occur as a side effect of another condition.*
*9 - Properly called amyloid plaques, these are protein deposits characteristic of certain diseases, including Alzheimer's. They are not well understood.*





**From Left to Right:**

**1. Amyloid plaque**
**2. Saunders with students in Guyana**
**3. At work in UWI**

# Lall Sawh

## UROLOGIST

Dr Lall Sawh is a local urologist who has advanced the practice and research of urology throughout the Caribbean. He introduced the concept of "buttonhole" surgery[1] to Trinidad and Tobago. In 1988, he became the first doctor in the Caribbean to transplant a kidney from a live donor to a recipient. This was one of many contributions that has earned Dr Sawh international respect and has placed Trinidad and Tobago on the map in the field of urology.

Lall Ramnath Sawh was born on 1st June, 1951 in Couva, Trinidad. His parents were humble shopkeepers. He helped them sell produce at their shop and in the marketplace. Despite his time-consuming domestic responsibilities, Sawh still managed to focus on his schoolwork at Couva Anglican School. His perseverance paid off in 1963, when he secured a place at the prestigious Naparima College and was later named Head Boy at the tender age of 16.

His academic performance at the secondary level earned him a place at the School of Medical Sciences at The University of the West Indies (UWI), Mona, Jamaica. He excelled in his studies and was awarded a Commonwealth Scholarship in Surgery. He ventured to Scotland in 1977 to train as a surgeon at the Royal College of Surgeons of Edinburgh. In 1985, he obtained a fellowship to the esteemed Mayo Clinic in Minnesota, USA.

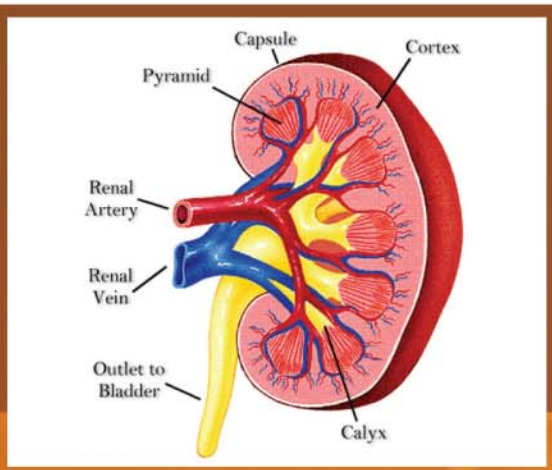
Returning to serve his homeland, Sawh was one of three urologists on the island. He brought innovation to his practice by learning and introducing many new surgical procedures including "buttonhole" surgery and kidney transplants. He also performed the first Renal Hypothermic Surgery[2] in Trinidad and Tobago in 1981. Dr Sawh also embraced new technologies and in 1996, he introduced the lithotripter[3] for kidney stone treatment. This fulfilled his

desire to improve kidney stone treatments for patients, since the machine removed kidney stones without surgical incision.

In 1998, Dr Sawh took the initiative to promote the use of Viagra worldwide in the face of many passive practitioners and skeptics. He also tackled the issue of male impotence through the use of surgical techniques never before utilised in the Caribbean. He made history by being the first in the Caribbean to construct a penis for a boy who was born without one.

On the strength of his significant achievements, Dr Sawh has been featured in many publications - *Who's Who in the World, Who's Who in the World of Intellects, and Who's Who in the World of Science and Technology*. At the national level, he was bestowed, in 1993, the Chaconia Medal (Gold) for his medical work, making him at age 43, the youngest ever awardee in the country's history in medicine. As an esteemed surgeon, Sawh currently lectures part-time at UWI and is an examiner of the UWI medical examinations.

*1 - A surgical procedure making a small incision of 1 inch diameter to remove kidney stones or to examine the kidney*
*2 - A bloodless kidney stone removal technique in which the kidney temperature is lowered to help minimise the chance of damage to the kidney*
*3 - A device that crushes kidney stones and gallstones by using shock waves*




**From Left to Right:**

1. Sawh, right, with son Dr Sean Sawh
2. Diagram of a human kidney
3. Sawh, right receiving San Fernando City Council Award from the Mayor

# Leslie Spence

## VIROLOGIST

Professor Leslie Spence was instrumental in the control and prevention of epidemic diseases in Trinidad. He is known for his work on arboviruses[1], which included the discovery of several new viruses, and for his work on enteroviruses[2] including the polio virus. As director of the Trinidad Regional Virus Laboratory, he developed the field of diagnostic virology to serve Trinidad and Tobago and the wider Caribbean.

Leslie Spence was born in St. Vincent in 1922. He received his early education in St. Vincent and Trinidad. He graduated in medicine from the University of Bristol, England in 1950, then studied tropical medicine at the London School of Hygiene and Tropical Medicine from 1950–1951. In 1951, he entered the Trinidad Medical Service and worked at the General Hospital in Port-of- Spain and in the District of Sangre Grande. In 1954, he was seconded to the Trinidad Regional Virus Laboratory of the Rockefeller Foundation and began a career in virology.

A year later, he undertook postgraduate studies in virology at the Rockefeller Foundation Virus Laboratories in New York City under Nobel Laureate, Dr Max Theiler. He continued postgraduate studies in bacteriology at the London School of Hygiene and Tropical Medicine. In 1962, he became Director of the Trinidad Regional Virus Laboratory and Senior Lecturer in Microbiology at The University of the West Indies (UWI), St. Augustine. He later received a Personal Chair in Virology at UWI.

In 1968, Spence emigrated to Canada where he was appointed Professor of Microbiology at McGill University in Montreal. In 1972, he was appointed Professor of Microbiology at the University of Toronto and Microbiologist at the Toronto General Hospital. He was elevated to Chairman of the Department of Microbiology of the University of Toronto and Chief Microbiologist at the Toronto General Hospital in 1983, and retired as Professor Emeritus in 1988.

Professor Spence did significant work on arboviruses in Trinidad and Tobago. Many of the arboviruses he isolated with a team at TRVL in Trinidad were new to science and others known to cause human diseases had not been previously reported from Trinidad and Tobago. He named three viruses after places in Trinidad and Tobago – Mayaro, Oropuche and Tacaribe[3]. His discovery of a patient suffering from yellow fever in Trinidad in 1954 led to the employment of control measures which prevented a serious outbreak of the disease in the rainy season. His virological studies on an outbreak of poliomyelitis in Guyana in 1962 led to the application of polio control measures in Trinidad and Tobago and the prevention of a similar outbreak in his own country. Professor Spence is also recognised for initiating and advancing rotavirus work in Trinidad and Tobago. Rotaviruses are a major cause of diarrhoeal disease in young children.

He served as a consultant to the National Institute of Allergy and Infectious Diseases and the National Institute of Health of the United States. He was a member of the American Committee on Arboviruses and various committees of the Pan American Health Organization. He was Chairman of the Canadian Medical Research Council's Grant Committee for Microbiology and Infectious Diseases from 1983 to 1986 and served on a number of committees of Health and Welfare Canada and the Ontario Government.

Professor Spence is a Fellow of the Royal College of Pathologists of England and a Fellow of the Royal College of Physicians and Surgeons of Canada. In 1999, he received the Canadian Association of Medical Microbiologists Founder's Award for Distinction in Medical Microbiology.

*1 – An arthropod-borne (group of invertebrates such as insects, spiders, crabs, centipedes and millipedes) virus: usually spread by a blood-sucking insect*
*2 – A group of easily replicated viruses e.g. the poliovirus, which causes polio*
*3 – The Mayaro virus was mistaken in the past for dengue, the Oropouche virus is considered to be one of the most important viruses of its type and the Tacaribe virus discovery changed the way scientists classified that family of viruses*

**From Left to Right:**

**1. One of viruses found and named by Spence, the Mayaro virus**
**2. Spence at the University of Toronto**
**3. Spence front row, far right with researchers at Bush Bush Forest**

# Geraldo Vieira

## CARNIVAL COSTUME INNOVATOR

Geraldo Vieira is a carnival costume designer, technologist and an entrepreneur. Without any formal training in costume-making, science or design, he was responsible for some of the more technically-innovative costumes seen in the Kings of Carnival competition in Trinidad and Tobago over the last few decades. His designs have won the title, King of Carnival nine times, and for three consecutive years from 1981. They include *The Demon Mantis*, *Mystic Dawn* and *Wind – An element of life*. His design, the *Swimming Angel* won Junior Queen of Carnival. He also won similar titles in Toronto, Canada at Caribana in 1996.

Geraldo Vieira was born on 24th November, 1938 in Barataria. He attended the San Juan Government Primary School, and later, trade school and Malick Senior Comprehensive for a short while. Vieira first fell in love with Carnival when he played his first "mas" in 1953.

He has participated in carnival competitions since then and created history in 1996 when his son, Geraldo Jr became the country's youngest King at the age of 19, wearing a costume he designed. He continued the history-making when he became the country's oldest King at the age of 67 in 2006, portraying *The Might of Rome.*

Vieira developed a fascination with craft and learned pattern-making as a trade. In the 1950s, wire bending was the popular method used in costume-making and Vieira mastered it, using it for some of his larger and more elaborate work. He replicated birds, fish and even the human form in wire with elaborate detail and accurate proportion.

As an upgrade from wire bending, he pioneered the use of plastic mouldings in his designs. His moulds were made of wood, concrete and bodicila[1] to create lighter, stronger

costumes. This led to the design of costumes for virtually every diasporic carnival, as well as regional carnivals in St. Maarten, St. Thomas, Barbados and St. Lucia.

He introduced the use of pyrotechnics in costumes in 1999, using special effects such as fireworks, robotics and lighting to create spectacular theatrical Kings of Carnival presentations, which won him numerous titles.

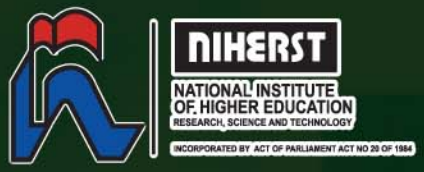
With methods that are both effective and cost-efficient, Vieira has always done his own research and is involved at several levels of the design process, even possessing enough skill to design tools for his specific needs. Forty-seven years in the field have given him an extensive knowledge of working with raw and synthetic materials, and he has built some of the most complex and intricate plastic injection moulds in the world. The demand for his moulds for costume-making goes beyond our shores to Curaçao, where he has many clients. His innovations have not, however, been limited to use in carnival costumes. He also produced customised plastic, vacuum form mouldings for the refurbished lobby area of the Trinidad Hilton Hotel and numerous signs for business places throughout the country.

In 2006, Geraldo Vieira designed Trini Revellers' *Rome: The Empire*, winning the large band category. In 2007, his band was called *The French Revolution*, a theme which had not been explored before in Trinidad Carnival. It won second place in Large Band of the Year and Vieira's costume won second place in the Carnival King category.

*1 - A lightweight material used in costume construction*

**From Left to Right:**

**1. Young Geraldo Vieira in costume**
**2. *The Might of Rome* (2006)**
**3. Father and son with awards**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