

**UNIVERSITY OF PORT HARCOURT**

**MY ODYSSEY AND THE  
COLOUR NOW IS GREEN**

**Valedictory Lecture**

**By**

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**VALEDICTORY LECTURE SERIES**

**NO. 29**

**APRIL 22, 2024**

University of Port Harcourt Press  
University of Port Harcourt,  
Port Harcourt  
Nigeria.  
E-mail: uniport.press@uniport.edu.ng

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VALEDICTORY LECTURE SERIES NO. 29  
DELIVERED: 22<sup>nd</sup> April, 2024

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## **PROGRAMME**

- 1. GUESTS ARE SEATED**
- 2. INTRODUCTION**
- 3. THE VICE-CHANCELLOR'S OPENING  
REMARKS**
- 4. CITATION**
- 5. THE VALEDICTORY LECTURE**

The lecturer shall remain standing during the citation. He shall step on the rostrum, and deliver his Valedictory Lecture. After the lecture, he shall step towards the Vice-Chancellor, and deliver a copy of the Valedictory Lecture and return to his seat. The Vice-Chancellor shall present the document to the Registrar.

- 6. CLOSING REMARKS BY THE VICE-  
CHANCELLOR**
- 7. VOTE OF THANKS**
- 8. DEPARTURE**

## **PROTOCOL**

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Ladies and Gentlemen

## **DEDICATION**

This Valedictory lecture is dedicated firstly to God Almighty, the Alpha and Omega and secondly to my bundle of joys Ethan, Aaliyah, Elora, Aliza and Eliana whom I love dearly.

## ACKNOWLEDGEMENT

Mr. Vice-Chancellor, permit me a few minutes to acknowledge some persons who played key roles in shaping my life and future. I thank Lord God Almighty most sincerely for lifting me up, planting my feet on higher grounds and granting me the Grace by making this day possible. May He alone be praised and glorified. I am grateful to my late parents Mr Upadibe Ideozu (“The Boy is Good”) and Mother Mrs Rhoda Ideozu whose love, care and proper upbringing initiated my future; may their gentle souls rest in peace. I would not fail to mention my siblings Fortune and Bertha with their families; their love and prayers are appreciated. My late brothers’ families are not forgotten; may they all have peace and prosper. I would like to express my special gratitude to my husband and my life partner Eze Igbu Odiokwu I, His Majesty, Elder (Arc.) Nnamdi O. Obuzor, (DSSRS) who encouraged me, supported all my quest and made sure that I became educated. His “elastic” tolerance and support to all my academic and professional travels are profoundly appreciated. I am very much grateful to my children Earl, Raymond, Oghenetega, Sharon, Marshal, Chinwe, Edmund, Lauretta, Donald and Precious who have always believed and stood by me. Thanks.

I acknowledge the contributions of some great academics at various points of my academic life notably amongst who are: late Prof. A. C. I. Anusiem, late Prof. S. N. Okiwelu, Prof. A. I. Spiff, Prof. S. O. Okeniyi, Prof. M. Horsfall *Jnr.*, Prof. B. W. Abbey, Prof. J. A. Ajienka, Prof. O. A. Georgewill, Prof. N. S. E. Lale (who also made me Vice-Chancellor for a DAY), Prof. E. C. Nduka, Prof. B. E. Okoli, Prof. K. Okrosaye-Orubite, Prof. E. Inam, Prof. C. Ogunka-Nnoka, Prof. I. Onyido, Prof. M.

Akpuaka, Prof. J. O. Ogbuagu and Dr. N. C. Ngobiri. I appreciate the members of the Chemical Society of Nigeria for all their contribution to my growth. Members of the Department of Pure and Industrial Chemistry have been so supportive to me and I am grateful. Mr. Vice-Chancellor Sir, it is with a deep sense of humility that I present the 29<sup>th</sup> Valedictory Lecture of the University of Port Harcourt and I give thanks to God who “upholds me with his victorious right hand”. Finally, I would like to thank the Vice Chancellor of the University of Port Harcourt (Prof. O. A. Georgewill) and the University Administration for making it possible for me to deliver the 29<sup>th</sup> Valedictory lecture of today and you the audience I also thank you for your presence and attention.





# **MY ODYSSEY AND THE COLOUR NOW IS GREEN**

## **INTRODUCTION**

### **Preamble**

Mr. Vice-Chancellor Sir, it is with a deep sense of humility, joy and fulfilment that I stand before you today to deliver a lecture to this August audience (in April my birth month) whose background in chemistry may be marginal yet deem it fit to honour this invitation. This is my second appearance on this podium, the first being when I delivered my Inaugural Lecture No. 143 on 16<sup>th</sup> November 2017 titled “My functional group affairs: pathway to ....?”. At that time, I introduced my new rank as a Professor and also advertised myself to town and gown. Inaugural Lecture affords one the opportunity to share their achievements in research, innovation, engagement and teaching activities before an audience of members of the University community and the general public. However, today, I have invited you here for a completely different purpose, this time is to announce to you that I am of age to bow out from a tenured position in the University System. I want to thank the Vice-Chancellor, Professor Owunari Abraham Georgewill for giving me the opportunity to deliver this Valedictory Lecture especially on my 70<sup>th</sup> BIRTHDAY.

## **WHAT IS A VALEDICTORY LECTURE?**

A valedictory lecture is a farewell address which gives one the opportunity to reminisce on one’s life in the University as one is ready to bow out and bare one’s mind over issues and experiences – be it good or bad; especially issues agitating one’s mind when one has been in a system for quite a while. In our

(UniPort) “Guidelines for Delivery of Inaugural and Valedictory Lectures”, we stated that unlike the inaugural lecture, the valedictory lecture should be less intellectually taxing and the environment more relaxing. The lecture should really provide opportunity to thank God and thank the University for the Opportunity to serve.

The following culled out questions need to be pondered upon and answered also:

- i) What can people learn from the experience?
- ii) What can society benefit from such experience?
- iii) Is there any advice one could leave behind for posterity to reap from?

Mr. Vice-Chancellor Sir, this is the 3rd Valedictory Lecture from the Department of Pure and Industrial Chemistry, the 29th in University of Port Harcourt and the 2nd female to give a Valedictory Lecture in this University: Professor Bene Willie Abbey being the first. Actually, some have bowed out through other means while others have done so through what every mortal will face, exiting to face the Creator before 70 years. But thanks be to Almighty God, I am privileged to stand before you and address you. I am very grateful to Almighty God.

## **MY ODYSSEY**

About 43 year ago (1981) I was posted to University of Port Harcourt for my National Youth Service Corps (NYSC), I was later sent to Department of Chemistry for my service year. Little did I know that the National Youth Service posting will amount to much as Devine providence offered me an employment a year

later. As I look back on my glorious journey at the University of Port Harcourt, I will like to share a few memorable junctures of this 42 years and 10 months' service to this UNIQUE University that used to have lunch break between 12 – 1pm and work starts by 8am then ends by 4pm for all.

In the course of my service to this University (from 1981 to 2024) my commitment and contributions to knowledge and service to the university culminated to my being elevated to the rank of Professor of Chemistry in April 2012; after having marked over 17,000 students ANSWER BOOKLETS. I also had the opportunity of serving the University in different capacities, such as, but not limited to the following positions and committees, namely:

1. 1985 - 1989. Treasurer, Senior Staff Club
2. 1986 - 1988. Member, University Junior Staff Committee
3. 1988 – 1992. Treasurer, Academic Staff Union of University
4. 1989 – 1991. Member, University Housing Committee
5. 2002 – 2008. Faculty Rep to Faculty of Education Board
6. 2005 – 2014 Coordinator, Students' Industrial Work Experience
7. 2009 – 2015 Faculty Rep. to University Affiliations Committee
8. 2009 - 2016. Coordinator, Departmental seminar series
9. 2010 – 2014. Faculty Rep. to Research and Development Committee

10. 2011 – 2014. Coordinator, Departmental Post Graduate seminar
11. 2012 – 2014. Chairman, Departmental Welfare Committee
12. 2012–2014. Chairman, Faculty of Science Welfare Committee
13. May – June (2014). Acting Head of Department of Pure and Industrial Chemistry.
14. 2016 – 2018. Head of Department of Pure and Industrial Chemistry.
15. 2019 – 2024. Chairman, Departmental Book Committee.
16. 2021 – 2024. Member, Joint Management Committee of Everyday Group of Companies.
17. 2023 – 2024. Member, Prof. Igwe’s Professorial Chair Board of Trustees

**Highlights of outcomes from some of the committees:**

- I was elected the Treasurer of Senior Staff Club, Uniport (1985-89) with Mrs. Alabukun as Club President. Membership to the club then was by subscription and on assumption of duties we observed that the club was broke so we came up with the idea that all Senior Staff should be members of Senior Staff Club and that dues should be deducted from source monthly however, any Senior Staff not willing to be a member should decline by writing to the University. At a general meeting of all Senior Staff the issue was discussed. The University was informed about our decision and nobody wrote about opting out of the Senior Staff Club Membership. Drinks were sold at reduced rates because the club was a distributor, more

members came to the club to relax especially 12 to 1pm and after work.

- I was elected Treasurer, Academic Staff Union of University (ASUU), Uniport Branch in 1988 in absentia with Dr. Biodun Olorofemi as Chairman (essential commodity and pack a case), later served under Prof. Julius Ihonvbere who later left for Canada and Dr. Princewill Alozie became the Chairman before ASUU was proscribed in July 1992 by the Armed Forces Revolutionary Council and I later left for further studies in September 1992. As treasurer, all cash payments were stopped and ONLY CHEQUES were used for all payments. ASUU used to serve meat pie, a suya and mineral during our monthly meetings bought from the staff club.
- As Head of Department, I initiated ways of improving teaching and learning in order to reduce failure rate in chemistry. A major initiative/my vision was the writing of standard and unified textbooks. My initiative could not be actualized under my headship but I was so glad when my predecessor Prof. Abaye propagated my vision and made me the Chairman of the book committee in absentia. The book committee came alive and the Department of Pure and Industrial Chemistry has collectively written six foundation textbooks for year one and year two courses which all lecturers now use for teaching; giving the department standard lecture materials for all our year one and two courses. The books were authored by all the lecturers in the department in their specific areas of

specialization. This has improved students' performance especially in the foundation classes. The departmental Book Committee is very grateful to all lecturers that bequeathed their books for use in this book collection. The forming of research groups did not succeed.

In 2012, I was a member of team UniPort that represented the University in Minna, Niger State at the 5<sup>th</sup> Nigerian Universities Research and Development Fair (NURESDEF) held in Minna, Niger State. It was a unique and fantastic experience. I am glad to see that UniPort has rejoined participation in NURESDEF. However, it's so unfortunate that we have not developed the products taken to all those fairs or Patents obtained by staff to enviable heights. We should remember that it's no longer Publish or Perish but Patent, Publish, Product. These products could be properly nurtured or incubated if UniPort Industrial Park is fully developed thereby writing a bolder tag for UniPort as an Entrepreneurial University. One of the outcomes will be a silent minting house for UniPort from the harvest of Patents, Royalties, License Incomes, Shares from Start-Ups/Spin-Offs, Contract Research incomes, Grants, Recognitions and Promotions.

Apart from services rendered to the University directly (which prepared me for my next level of service), participation in professional bodies was encouraged to enhance an academician. Professional societies are organizations that bring together individuals who share a common profession, interest, or goal. Belonging to a professional body or society provides numerous benefits for individuals in various industries. Some of these

benefits include socialization, networking opportunities, continuing education, certifications, advocacy and representation, resources and publications, mentorship and leadership opportunities, and job opportunities. Individuals can enhance their professional standing and advance their careers by participating in a professional society. I am privileged to belong to several of such societies but to name few such as Chemical Society of Nigeria (CSN), Organization for Women in Science for the Developing World (OWSD), American Chemical Society (ACS), Royal Society of Chemistry (RSC), Federation of African Society of Chemists (FASC), Pan African Chemist Network (PACN), International Union of Pure and Applied Chemistry (IUPAC) and Federation of Commonwealth Chemical Societies (FCCS).

In 1988 I joined the Chemical Society of Nigeria (CSN), became a Life – Member in 1991, member of Council 2001 – 2019 and we usually have four council meetings per year and I have missed only one council meeting. I have also served CSN in the following capacities:

- 2001-2005. National Treasurer, Chemical Society of Nigeria (CSN).
- 2003-2007. First Female Chairman, Chemical Society of Nigeria (CSN) Rivers/Bayelsa States Chapters
- 2005-2014. National Chairman, Awards and Education Committee of the Chemical Society of Nigeria (CSN)
- 2007, Fellow, Chemical Society of Nigeria (FCSN).
- 2011-2014. National Vice-President, Chemical Society of Nigeria (CSN).
- 2014 – 2017. President, Chemical Society of Nigeria

Prof. Gloria Ukalina Obuzor, the First Female President of the Chemical Society of Nigeria (CSN) in its 37 years of existence by 2014 and up till now; I was awarded the Highest Honor of the CSN Distinguished Lifetime Achievement (*DLA*) in 2019 amongst other awards. I have attended over 70 conferences, in person and 30 virtuals which were mostly after COVID-19. As a member of CSN, I have been consistent to attended twenty-seven out of twenty-eight CSN conferences every third week of September and this afforded me local travels and networking opportunities. I relish these conferences. In 2015, I founded the Women in Chemistry which is now a very active Division in CSN. As a member of the CSN, I received several trainings in chemical security and safety in Lagos and Abuja. Continuing education, mentorship and leadership opportunities, and job opportunities were exhibited when in 2019 I (Principal Investigator) attracted a grant of \$100,814.00 (one hundred thousand eight hundred and fourteen dollars) only for Workshop on Chemical Security Awareness sponsored by The U. S. State Department of Chemical Security Program (CSP), in collaboration with implementing partner Civilian Research and Development Foundation Global (CRDF Global) and organized by the Chemical Society of Nigeria in Port Harcourt, Enugu, Abuja, Jos, Kaduna and Lagos. The Workshop on Chemical Security Awareness was a train the trainer workshop where 25 participants were trained in each of the Geo-Political Zones of Nigeria. These participants have equally obtained grants for the training of other 25 participants. This training propagation is still going on. My tenure as CSN President brought the Society to international limelight and financial increase that it has never had before.



## **MY INTERNATIONAL CONFERENCE PARTICIPATIONS**

In 2010 under the umbrella of Third World Organization for Women in Science (TWOS) NOW Organization for Women in Science for the Developing World (OWSD) I went to Beijing, China where I had the rare privilege to climb the Great Wall of China, saw the Forbidden City and Tiananmen Square (OH OWSD and UNIPOINT THANK YOU). For OWSD international conference, usually the host country provides accommodation and feeding for all participant while individuals pay for their flights and in 2016, I travelled to Kuwait for OWSD international conference; I was blessed that the Kuwait Government refunded me my flight ticket. In 2010, after my return from China I established OWSD branch at University of Port Harcourt and handed over in 2019 to a younger vibrant team which I envisioned will do better than myself against the preference of some members. I am so glad that I took that decision because of the trailblazing output of that team which has made OWSD UniPort Branch a household name and the best in the World as members have benefited so much in winning awards, grants and bringing various types of laurels to themselves and UniPort.

- In 2013 TETFUND facilitated my visit to Saussignac, France for a wine workshop where I learnt much about wine, winery and enotourism.
- In 2016 I attended a Green Chemistry Conference in Venice, Italy while I was invited in 2019 and these conferences perked my interest in this special area of

chemistry (Green Chemistry) with the gains it represents.

- American Chemical Society (ACS) facilitated my conference trip to Austin, Texas, USA in 2014; in 2016 I was in Kuala Lumpur, Malaysia for Global Code of Ethics by ACS International Activities Committee and office of International Activities Committee; a conference trip to San Francisco, California, USA in 2017; water treatment facility and a laboratory tour to Washington, D. C. and Manassas (Virginia) respectively in 2017 and a conference trip to New Orleans, Louisiana, USA in 2018.
- The CSN as a member of IUPAC has afforded me the opportunity of advocacy and representation, the ease of travel to Busan, South Korea in 2015, to Sao Paulo, Brazil in 2017, I was elected into IUPAC Council in 2019 in Paris, France and I became one of the two Africans (an Egyptian and myself) ever to be elected into that board. In 2023 I travelled to The Hague as a board member because CSN is a member of IUPAC where I was elected a member of Committee of Chemistry Education.
- CSN is also a member of Federation of African Society of Chemists (FASC); I travelled to Arusha, Tanzania in 2017, to Gaborone, Botswana in 2019 where I was elected the Vice-President of FASC and in 2022 I was elected FASC President in ABSENTIA in Marrakesh, Morocco.
- My travels to Ghana and Kenya in 2017 were under RSC and PACN while

- My visit to Setif, Algeria in 2017 facilitated by CSN was to bid for the hosting Right of African Conference Research in Chemistry Education (ACRICE) by CSN in 2019. It also afforded me the opportunity to attend a workshop on a chemical security there.
- Federation of Commonwealth Chemical Societies (FCCS) and RSC facilitated my travel to Trinidad and Tobago in 2023 as a Speaker.

**INVITED PHYSICAL SPEAKING ENGAGEMENTS ARE:**

- In 2019, Nature the Chemist Untapped Warehouse, IUPAC Postgraduate Summer School on Green Chemistry Conference in Dar es Salaam, Tanzania.
- 2020, “Creating Sustainable Technical and Vocational Education and Training for Employment of Young Women in Nigeria at the Inauguration of Women in Technical Education and Employment Nigeria, Captain Elechi Amadi Polytechnic Chapter, Rivers State, Nigeria.
- 2020, Chemical Security and Chemical Safety: A Challenge of the Contemporary Time by Joseph I. Okogun, Ph.D., *FCSN, FAS, FRSC, FNSP*. Presented by Prof. Gloria U. Obuzor.
- 2021, The Implications of a Chemical Product and its Wastes at the 9<sup>th</sup> Annual lecture series, Faculty of Science, Nnamdi Azikiwe University, Awka, Anambra State, Nigeria.
- 2021, Science and Technology: Instrument for Societal Change, 6th National Conference, School of Science and

Technology, Captain Elechi Amadi Polytechnic Rumuola, Port Harcourt.

- 2022, Scientific Innovations: A Panacea for Sustainable Development “Emerging Scientific Innovations”, 3<sup>rd</sup> Annual Conference, Faculty of Applied and Natural Sciences, Ignatius Ajuru University of Education, Port Harcourt, Nigeria.
- 2022, Oil Exploration in the Niger Delta Region: Impact on National Development in the Phase of Current Pandemic, The Chemical Society of Nigeria South-South Zonal Conference in Asaba, Delta State, Nigeria.
- 2023, Better Living: Adaptation of Clean Water (SDG 6) and Sanitation with Effective Climate Action (SDG 13), 2<sup>nd</sup> Commonwealth Chemistry Congress—Partnerships for the Goals, University of West Indies, St. Augustine Campus, Trinidad and Tobago.
- 2023, The Impact of a Chemical Product and its Waste on Society: Friend or Foe, African Early Career Chemist Workshop and 8<sup>th</sup> American Chemical Society (ACS) Nigeria Annual Symposium, Uyo, Akwa Ibom State, Nigeria,
- 2023, “Innovation and Development in Chemical Sciences for Industrial and Economic Sustainability”: Green Chemical Process and Environmental Sustainability, The Chemical Society of Nigeria Annual International Conference, Workshop and Exhibition, Awka, Anambra State.

In 2020, at CSN conference in Abuja I stood on the shoulder of a giant Prof. Joseph I. Okogun, Ph.D., *FCSN, FAS, FRSC*,

*FNSP* and presented his paper “Chemical Security and Chemical Safety: A Challenge of the Contemporary Time” because he could not travel back to Nigeria from USA.

### **THE COLOUR NOW IS GREEN.**

Chemistry is a discipline that falls somewhere between physics and biology in terms of scope. It is also referred to as the “core science” since it provides a fundamental framework for understanding both basic and applied scientific disciplines. Chemistry, for example, explains aspects of plant chemistry (botany), the formation of igneous rocks (geology), how atmospheric ozone is formed and how environmental pollutants are degraded (ecology), the properties of lunar soil (cosmochemistry), how medications work (pharmacology), and how to collect DNA evidence at a crime scene (criminology) (forensics). Chemistry is also often referred to as the central science because it joins together physics and mathematics, biology and medicine, and the earth and environmental sciences. Knowledge of the nature of chemicals and chemical processes therefore provides insights into a variety of physical and biological phenomena. Therefore, researchers and students’ success in the other Sciences, Engineering, Medicine, etc. is anchored on their knowledge of Chemistry.

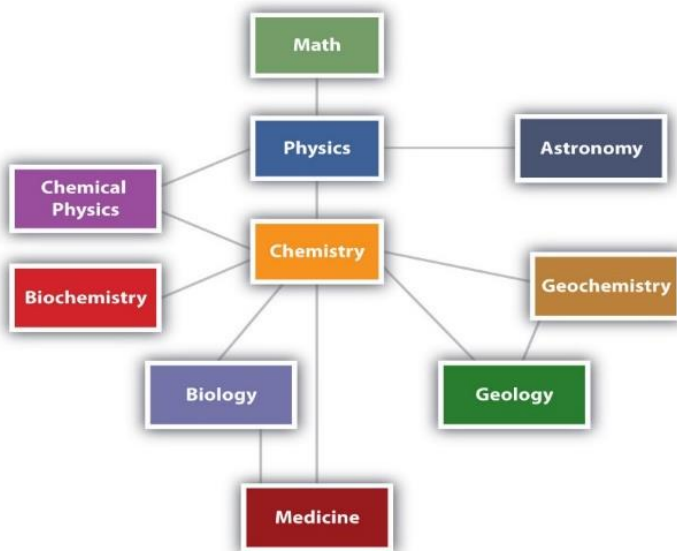


Figure 1: The Relationships between Some of the Major Branches of Science.

Mathematics is considered the mother of all sciences because it is a tool which solves problems of every other science. Other subjects like Biology, Chemistry or Physics is based on simple chemical solutions. Chemistry lies more or less in the middle, which emphasizes its importance to many branches of science hence it is called the central Science and maybe that is why all the other science subjects need Chemistry for University admissions. Poor level of performance in Mathematics among science students has led to science students choosing options with less Mathematical content. In the case of Chemistry very few students opt for inorganic Chemistry, Physical Chemistry, Process Chemistry, Mineral processing, and etc. This has led to the lack of lecturers in such areas as such, the present lecturers

in these areas need to be specially encouraged. As HoD, the University Management was gracious to employ one of the cases I presented for Process Chemistry after much negotiations. Secondly, Mr. Vice-Chancellor sir, may I strongly recommend that our First-Class students be offered employments into those hard-point areas of Chemistry.

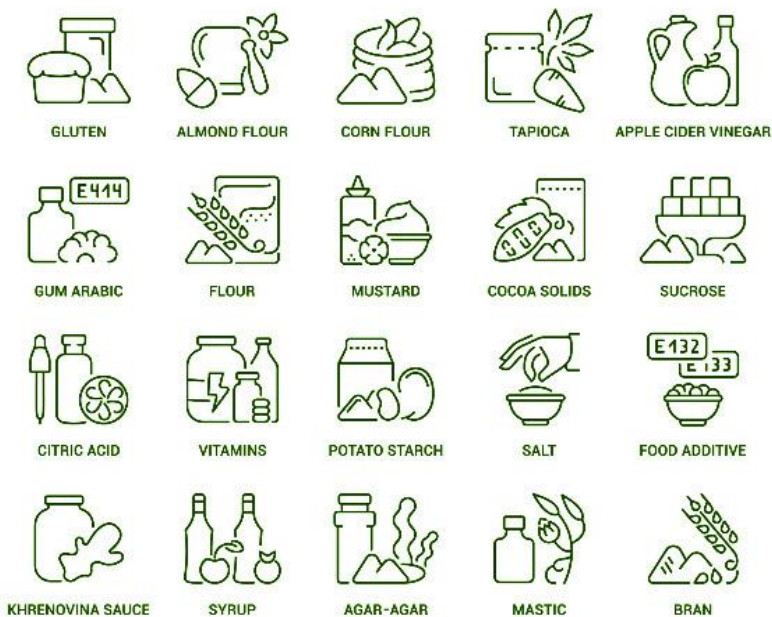


Figure 2: Importance of Chemistry in Everyday life.

## **GREEN CHEMISTRY**

Green Economy, Green Africa, Green Hope, Operation Green....and etc. Even the Nigerian flag is Green. As such,

The colour now is GREEN and CHEMISTRY, the central science is not left out. This green colour, has given chemistry, the central science a new captivating field called GREEN CHEMISTRY. Green chemistry, is an approach to chemical design and production that aims to minimize the use and generation of hazardous substances throughout the life cycle of a chemical product (“Cradle to Grave”). This field seeks to promote the development of processes and products that are environmentally benign, economically viable, and socially responsible. The green chemistry revolution provides an enormous number of opportunities to discover and apply new synthetic approaches using alternative feedstocks. The main goals of Green chemistry, also called sustainable chemistry, is an approach to chemistry that attempts to prevent or reduce pollution. It also tries to improve the efficiency of chemical products by changing how chemicals are designed, manufactured, and used. The usefulness of Green chemistry is exemplified as it also plays an important role in alternate energy science, and the production of novel methods to make solar cells, fuel cells, and batteries for energy storage. Secondly, self-assembling molecules use bio-based plant materials which also involves green chemistry principles. Uses of green chemistry in day to day life are numerous, including the use of green ingredients in the food industry, new materials for construction and packaging, safer use of chemicals in agriculture and pharmaceuticals.



The trend of words in the world is related to sustainable development such as "green" has become a new trend in everyday human life which aims to analyze and map the chemistry learning with green chemistry insight for undergraduate students of chemistry education program as an effort to conserve the environment as one of the Sustainable Development Goals (SDGs). Green Chemistry is a term introduced by Paul Anastas and John C. Warner in 1998 who proposed the 12 Principles of Green Chemistry as outlined within this lecture; they declared a philosophy that motivated academic and industrial scientists at the time and continues to guide the green chemistry movement. Green chemistry plays an important role in sustainable development as it can be used to develop innovative methods of chemical synthesis that are safer for humans and the environment. This creates new opportunities for sustainable development and sets the platform for the achievement of the SDGs.

## **GREEN CHEMISTRY IN UNIVERSITY CURRICULUM AND SDGS**

Chemistry education plays a crucial role in implementing the Sustainable Development Goals (SDGs). By incorporating green chemistry principles into the curriculum, chemistry learning can contribute to SDGs such as responsible consumption and production, climate action, and environmental stewardship. Chemistry education can promote sustainable development by teaching students about environment from the basics, sustainability, and the role of chemistry in society. It can also help students develop positive environmental values, attitudes, and skills necessary for active participation in creating

a sustainable future. To achieve this, pedagogical frameworks and models for education for sustainable development in chemistry have been proposed, which focus on integrating socio-scientific issues and green chemistry into basic chemistry education. Overall, chemistry education provides an opportunity to educate students about sustainable development and empower them to make a positive impact on the environment and society. Green chemistry is an essential field of study that plays a significant role in addressing environmental and sustainability challenges. Integrating green chemistry into university curricula is not only beneficial for students but also contributes to the achievement of Sustainable Development Goals (SDGs). Here's how green chemistry and university curricula align with the SDGs:

1. SDG 4: Quality Education

- University curricula that incorporate green chemistry principles help educate students about environmentally friendly and sustainable chemical processes. This contributes to quality education by preparing the next generation of scientists and professionals to address global challenges.

2. SDG 9: Industry, Innovation, and Infrastructure

- Green chemistry fosters innovation in chemical processes, materials, and technologies that reduce the environmental footprint of industries. Universities can support this SDG by teaching students how to develop innovative and sustainable solutions for various industrial sectors.

3. SDG 12: Responsible Consumption and Production
  - Green chemistry promotes the design and use of chemicals and materials that are safer, more sustainable, and less resource-intensive. Universities can educate students about sustainable production and consumption practices to advance this goal.
4. SDG 13: Climate Action
  - Green chemistry principles emphasize reducing greenhouse gas emissions and minimizing the carbon footprint of chemical processes. Integrating green chemistry into university curricula can help train students to develop solutions that contribute to climate action.
5. SDG 14: Life Below Water and SDG 15: Life on Land
  - Green chemistry minimizes the release of hazardous chemicals into the environment, which can protect aquatic and terrestrial ecosystems. Teaching green chemistry in universities helps students understand the importance of preserving biodiversity and ecosystem health.
6. SDG 17: Partnerships for the Goals
  - Collaboration between universities, industries, and government agencies to promote green chemistry research and education can support partnerships for sustainable development. Universities can act as hubs for fostering collaboration and knowledge sharing related to green chemistry.

Incorporating green chemistry into university curricula may involve developing dedicated courses, research projects, and interdisciplinary programs that emphasize sustainable and environmentally responsible chemical practices. This educational approach equips students with the knowledge and skills needed to drive positive change and aligns with the broader global efforts to achieve the SDGs.

Additionally, universities can contribute to the advancement of the SDGs by conducting research in green chemistry/(science) and fostering partnerships with local and global stakeholders to promote sustainable practices in the chemical/(science) industry and beyond.

My Vice-Chancellor Sir, at this point, I pray you use your good office to ensure the University of Port Harcourt reverses the removal of foundation Chemistry courses in all Sciences, Medical and Engineering based departments. This will lead the production of green (sustainable) professionals. Let us bear in mind that those who earlier designed the programs, did so in their wisdom. Also, the failure of students in basic science courses should not be used as a reason to delist such courses, as it will amount to throwing away the baby with the bathwater.

Also, in as much as departments can domesticate higher-level borrowed courses, such courses must be taught either jointly by lecturers from both departments or the offering department should employ qualified professionals, not their professionals.

A situation where Organic, Inorganic Chemistry etc. are taught by lectures without a Ph. D in them is not acceptable.

Additionally, collaborative departments at Post-graduate level should give students the opportunity to pursue a dual degree for more impact (courses from both departments but one co-supervised project).

## **APPLICATION OF THE TWELVE PRINCIPLES OF GREEN CHEMISTRY AND DAILY LIVES**

By incorporating the twelve principles of green chemistry into our daily lives, we can contribute to a more sustainable future. Three contributions of green chemistry in day to day life are cleaner water: less release of hazardous chemical wastes to water leading to cleaner drinking and recreational water. Increased safety for workers in the chemical industry; less use of toxic materials; less personal protective equipment required; less potential for accidents (e.g., fires or explosions). The twelve principles of green chemistry provide a framework for the development of environmentally friendly and sustainable products, processes, and technologies. By applying these principles to our daily lives, we can contribute to a more sustainable future. The codified twelve principles of green chemistry and how they can be applied to our daily living:

1. **Prevention:** By designing chemical products and processes to generate less or no waste, we can reduce the amount of pollution created. For example, using rechargeable batteries instead of single-use alkaline batteries helps prevent the disposal of harmful chemicals found in alkaline batteries.

2. **Atom Economy:** Designing chemical processes that maximize the conversion of raw materials to products can minimize waste and maximize efficiency. Choosing products made from renewable resources, like bamboo toiletries instead of plastic ones, supports this principle.
3. **Less Hazardous Chemical Syntheses:** Using inherently less hazardous chemicals and solvents in chemical synthesis can reduce the potential for harm. Opting for water-based paints and cleaning products reduces the use of harmful solvents.
4. **Design for Energy Efficiency:** Developing chemical processes that minimize energy consumption helps reduce greenhouse gas emissions. Using energy-efficient appliances, like LED light bulbs and smart power strips, reduces energy consumption in our homes.
5. **Use of Renewable Feedstocks:** Using raw materials derived from renewable sources, such as plant-based materials, can reduce the dependency on non-renewable resources. Choosing products made from sustainably sourced materials, like bamboo toothbrushes, supports this principle.
6. **Reduce Derivatives:** Unnecessary derivatization of chemicals can lead to the generation of additional waste. Opting for products with fewer synthetic additives and choosing more natural ingredients can help reduce derivatives.
7. **Catalysis:** Designing chemical reactions that use catalysts can minimize the number of reagents needed and reduce waste. Using products that are biodegradable or have fewer synthetic ingredients can support this principle.

8. **Design for Safer Solvents and Auxiliaries:** Minimizing the use of auxiliary substances in chemical reactions can reduce the potential for harm. Using products with fewer synthetic ingredients and choosing biodegradable options can help achieve this.
9. **Design for Safer Reagents and Catalysts:** Reducing the use of hazardous reagents and catalysts in chemical synthesis can minimize the potential for harm. Choosing products made from natural, non-toxic ingredients can support this principle.
10. **Real-time Analysis for Pollution Prevention:** Integrating pollution prevention and control strategies into chemical processes can help minimize environmental impacts. Choosing products with transparent and responsible manufacturing practices can support this principle.
11. **Inherently Safer Chemistry for Accident Prevention:** Designing chemical products and processes that minimize the potential for accidents can reduce the risk of harm. Choosing products with safer formulations and packaging can support this principle.
12. **Innovating Greener Synthetic Pathways:** Developing new methods and technologies that minimize environmental impact can lead to greener chemical processes. Supporting companies that prioritize sustainability and innovation can help promote this principle.

By incorporating the twelve principles of green chemistry into our daily lives, we can contribute to a more sustainable future. By making conscious choices about the products we use, we can reduce our environmental impact and promote a greener, healthier world.

Green chemistry, while often discussed in the context of industry, must also factor into a comprehensive undergraduate education. In teaching chemistry at university, the curriculum can be tailored to incorporate not only green chemistry principles but also the United Nations Sustainable Development Goals (SDGs) from early general chemistry laboratories to more advanced independent study projects. Six methods to incorporate green chemistry and the SDGs into undergraduate education, ranging from student research projects to student-led community outreach events are:

- Designing curriculum that includes green chemistry principles and the SDGs from early general chemistry laboratories to advanced independent study projects for senior chemistry majors.
- Encouraging student research projects focused on green chemistry and the SDGs, providing opportunities for students to explore and contribute to sustainable solutions.
- Organizing student-led community outreach events that promote green chemistry and raise awareness about the SDGs, engaging the local community in sustainable practices.
- The use of organic chemical-based socio-scientific issues comics as a tool for raising awareness among students



about sustainable development agenda in chemistry education.

- The development and implementation of these comics, which integrate organic chemistry concepts with socio-scientific issues.
- Design comics to present real-world scenarios and ethical dilemmas related to organic chemicals, engaging students in critical thinking and decision-making processes.

## **EXAMPLES OF RESEARCH IN GREEN CHEMISTRY**

Green chemistry research encompasses a wide range of topics aimed at developing sustainable and environmentally friendly solutions in the field of chemistry. Here are some examples of research areas and specific projects in green chemistry:

1. **Renewable Energy:**
  - Development of efficient and environmentally friendly catalysts for fuel cells and hydrogen production.
  - Research on next-generation solar cell materials, such as perovskite solar cells, with reduced toxicity and improved efficiency.
2. **Sustainable Materials:**
  - Bioplastics and biodegradable polymers to replace traditional plastics.
  - Exploration of sustainable alternatives to rare and toxic materials used in electronic devices and consumer products.
3. **Green Solvents and Processes:**
  - Investigation of non-toxic and biodegradable solvents to replace traditional, hazardous ones in chemical processes.

- Development of innovative and energy-efficient reaction mechanisms to reduce waste and emissions.
- 4. Waste Reduction:**
- Design of catalysts and processes to convert waste materials, such as carbon dioxide, into valuable products.
  - Development of methods to recycle and upcycle waste materials, such as plastics and textiles.
- 5. Sustainable Synthesis:**
- Design and synthesis of pharmaceuticals and fine chemicals with reduced environmental impact and improved sustainability.
  - Green synthesis of nanomaterials and nanoparticles for various applications, including environmental remediation and drug delivery.
- 6. Water and Air Quality:**
- Advanced methods for removing pollutants from water and air, such as adsorption, catalytic processes, and photocatalysis.
  - Sustainable approaches to water purification and wastewater treatment.
- 7. Green Analytical Chemistry:**
- Development of eco-friendly analytical techniques, including the use of green solvents and reduced energy consumption.
  - Sensor and assay development for detecting environmental pollutants and toxins.
- 8. Sustainable Agriculture:**
- Design of eco-friendly pesticides and herbicides that minimize harm to the environment and human health.

- Research on green fertilizers and soil improvement techniques for sustainable agriculture.
- 9. Sustainable Food Chemistry:**
- Development of food preservation methods that reduce food waste and enhance shelf life.
  - Exploration of plant-based and sustainable alternatives to traditional food additives and preservatives.
- 10. Biodiversity Conservation:**
- Research on the impact of chemicals and pollutants on ecosystems and biodiversity.
  - Development of strategies to protect and restore ecosystems affected by chemical contamination.

These are just a few examples of the diverse research areas within green chemistry. Green chemistry researchers strive to find innovative solutions that reduce the environmental footprint of chemical processes, materials, and products while promoting sustainability and the well-being of both human and environmental systems.

These are some of my involvement in Green Chemistry Research Activities.

1. Green Solvents and Processes:
  - Investigation of non-toxic and biodegradable solvents to replace traditional, hazardous ones in chemical processes “Utilizing fermentation process to extract nutraceuticals and bioactive agents” (Patent).

2. Waste Reduction:
  - Development of methods to recycle and upcycle waste materials, such as plastics and bricks (Patent).
3. Biodiversity Conservation:
  - Development of strategies to protect and restore ecosystems affected by chemical contamination (Publications).
4. Sustainable Synthesis:
  - Green synthesis of nanomaterials and nanoparticles for various applications, including environmental remediation (Publications).

Nigeria's best Green Chemistry products is an Ethanol Biogel.



## **BIOFUEL PRODUCTION**

Production and Characterization of Ethanol Biogel, An Alternative Energy Source for Cooking

- A research innovation on product development: Bio-ethanol was produced using pretreated sawdust as substrate by solid state fermentation technique using *Aspergillus niger*. The bio-ethanol was further used in combination with water and hydroxyethylcellulose (a nitrosol compound) in a ratio (70:10:20) for production of ethanol biogel.

Saw dust as substrate and treated with water hyacinth extract to obtain BIOFUEL

“PROFESSOR GLORIA UKALINA OBUZOR” the President, Federation of African Society of Chemist who is often *imitated* but *never equaled*: is the first female President of The Chemical Society of Nigeria, first female Professor of Chemistry in Rivers State, first black African in IUPAC Council, first female Chapter Chairman of CSN, first book committee chairman of PIC, first Inaugural Lecturer whose citation was read by the Vice-Chancellor of UniPort Prof. N. S. E. Lale in 2017, first Coordinator OWSD UniPort, founder PUGO awards in CSN and OWSD, founder/initiator Women in Chemistry of CSN and OWSD (UniPort) is saying

("I shall pass this way but once; any good, therefore, that I can do or any kindness that I can show to any human being, let me do it now. Let me not defer nor neglect it, for I shall not pass this way again") - Etienne de Grellet.

Before I conclude. I wish University of Port Harcourt could adopt the American science education curriculum format for secondary school teachers whereby a student MUST have a degree in the core subject then obtain a certificate in teaching methods for that subject.

## **CONCLUSION**

My digital Vice-Chancellor Sir. Ladies and Gentlemen. There are some retired/serving Professors that have never presented a paper in any conference both local and international however, in my ODYSSEY of life and my sojourn in this UNIQUE University “UniPort” has been wonderful. I enjoyed my teaching and I enjoyed myself. Veni, vidi, vici. The Youth Corper that came to UniPort 43years and 10months ago is retiring as a Professor in good health, a Chemical Society Ambassador, leaving legacies having mentored over 1000 mentees (five by application), sponsored two members of my department for further studies, and a “FEAT”; Department of Pure and Industrial Chemistry jointly publishing six Foundation Textbooks says THANKS BE TO:

- GOD ALMIGHTY for keeping me alive,
- UniPort for the opportunity to serve and the
- Chemical Society of Nigeria members for voting for me as First Female President which was the key to international exposures.

The following culled questions need to be pondered upon and answered:

- i) Can people learn from the experience? JUSTIFIED.
- ii) Can society benefit from such experience? JUSTIFIED.
- iii) Is there any advice one could leave behind for posterity to reap from? JUSTIFIED.

**THANK YOU SO MUCH FOR YOUR KIND ATTENTION.**

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## CITATION ON



**PROFESSOR GLORIA UKALINA OBUZOR, FCSN, DLA**  
*B. Sc (UDC, Washington, D.C.), M. Sc (UPH)*  
*and Ph. D (UMIST, UK)*

Prof. Gloria Ukalina Obuzor was born on 22<sup>nd</sup> April, 1954 in Ahoada in Ahoada East Local Government Area of Rivers State to Mr Upadibe Israel Ekpahulu Ideozu of Umu-Eyekele Kindred of larger Umu-Akpa family of Ahoada Town and Mrs. Rhoda Ideozu of larger Umu-Akpa family of Odiabide Town all in Ahoada East Local Government Area of Rivers State (both late). Gloria Ukalina Obuzor is a Professor of Chemistry who had her Primary education at St. Michael's Primary School, Rumuomasi (1966), Secondary Education at Holy Rosary Secondary School, Port Harcourt, Rivers State (1973) with a Shell, BP scholarship,



a B. Sc. in Chemistry (1979) at University of the District of Columbia, Washington, D. C., USA with a River State Government Scholarship, an M. Sc. in Polymer Chemistry (1989) at University of Port Harcourt (Uniport), Port Harcourt, Rivers State, Nigeria with Uniport Partial Sponsorship and a Ph. D. in Organic Chemistry (1998) at University of Manchester Institute of Science and Technology (now Victoria University), Manchester, UK with Commonwealth Scholarship. She went through the rank and file to become a Professor in 2012. Her major research interests are in Organic synthesis, Phytochemistry and Oenology. She has passion for product development and she is the proud producer of Ukalina Wines (White and Red). Her product liquid soap with modified chemical content won the first prize in an all Nigerian University Research Competition organized by the Chemical Society of Nigeria (CSN) in 2011 during the International Year of Chemistry (IYC 2011). Her products: Ukalina wine won the first position while her waste to wealth product took the second position in 2016 during the International Conference, Workshop and Exhibition of the Chemical Society of Nigeria (CSN) tagged “Garden City 2016”

Prof. Gloria Ukalina Obuzor who is an unassuming pacesetter, an amiable, humble, and a God-fearing Woman, is the President, Federation of African Society of Chemists (FASC); first black Member of International Union of Pure and Applied Chemistry (IUPAC) Bureau since its establishment in 1919 and the first female President of the Chemical Society of Nigeria (CSN) in its forty-six years of existence as of 2014 but the 13<sup>th</sup> President of CSN.

Prof. Obuzor is happily married to Eze Igbu Odiokwu I, His Majesty, Elder (Arc.) Nnamdi O. Obuzor, (DSSRS) from Odiokwu village in Ahoada West Local Government Area and the marriage is blessed with six children and five grandchildren.

**Professor Owunari A. Georgewill**  
Vice-Chancellor