

## UMENWEKE, CHUKWUDALU GREAT

Biofuels and Environmental Catalysis Laboratory, Center for Applied Energy Research, 2540  
Research Park Dr., Lexington, Kentucky.

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### RESEARCH AREA

My research area of interest revolves around heterogeneous catalysis and biorefining. My research skill involves the preparation, synthesis and design of catalysts. I have experience with catalysts characterization techniques such as N<sub>2</sub>-Physisorption, XRD, NH<sub>3</sub>/CO<sub>2</sub> TPD, TPR, H<sub>2</sub> pulse chemisorption and in-situ spectroscopy (FTIR); in addition to the environmental and economic assessment of heterogeneous catalysis in the conversion of biomass into drop-in chemicals and transportation fuels.

### EDUCATION

**University of Kentucky, Lexington, Kentucky** **Aug 2020 - Present**

PhD Student, Department of Chemistry

**Federal University of Technology, Owerri (FUTO)** **2012-2017**

Bachelor of Engineering (B.Eng.), Chemical Engineering

### RESEARCH AND DESIGN EXPERIENCE

**Graduate Research Assistant, *Biofuels and Environmental Catalysis Laboratory, Center for Applied Energy Research (CAER), University of Kentucky*** **Jan 2021-Present**

- Research Thesis: Lipid Upgrading - The application of heterogeneous catalysis to the production of renewable fuels and chemicals – with emphasis on the catalytic deoxygenation via decarboxylation/decarbonylation of biomass-derived fats, oils and greases (FOG) to drop-in hydrocarbon fuels. Advisor: Dr. Eduardo Santillan-Jimenez

- NSF Traineeship Research: Thermochemical biomass conversion of forest residue for economic viability of Biorefineries - National Science Foundation Graduate Research Traineeship (NRT) Trainee research on valorization of Lignin to improve economic viability of Biorefineries. PI: Prof. Mark Crocker and Co-PI/manager: Dr. Eduardo Santillan-Jimenez

**Research Intern, Chemical, Fiber and Environmental Technology (CFET) Division, Federal Institute of Industrial Research, Oshodi (FIIRO), Lagos, Nigeria. 2015-2018**

- Collaborated with researchers and worked on research such as biodiesel production, oil extraction, biopolymer production from chitosan.

**Assistant Trainee, Spunt Innovatia Services, Alapere Ketu, Lagos, Nigeria.**

- Assisted in training students, engineers and professionals in process simulations and data analysis softwares, such as ASPEN Hysys, COCO, Chemsep and DWSIM.

**Undergraduate Research Student,**

**Mar 2017-Nov 2017**

- Carried out a research project on the kinetics of alkali catalyzed transesterification reaction of palm kernel oil and the characterization of the biodiesel product.
- Plant design project of a plant that produces 50,000 metric tons per annum of cement plant, using limestone from Ekiti state, Nigeria.

## **TEACHING AND PROFESSIONAL EXPERIENCE**

**University of Kentucky, Lexington, Kentucky**

**Jan 2021-Present**

Graduate Teaching Assistant (GTA), Department of Chemistry

- Assist in classes and recitations for undergraduates Chemistry Students, in General Chemistry CHE107/113.
- Assist in conducting laboratory experiments and laboratory sessions for Chemistry Undergraduates.
- Held office hours and graded general chemistry laboratory reports.
- Fall 2021 Microteaching Group 30 Leader for new Teaching Assistants

Microteaching Group Leader, University of Kentucky

- Assisting the school of graduate studies in the orientation of new teaching assistant into University of Kentucky

**University of Abuja, Gwagwalada, FCT-Abuja**

**2018-2019**

Teaching Assistant and Assistant laboratory coordinator

- Assisted in tutorials on Chemical Engineering Thermodynamics and Engineering Thermodynamics for third and second year's undergraduate students respectively.
- Assisted in conducting laboratory experiments and laboratory assessments for Chemical engineering undergraduates.

## **INDUSTRIAL EXPERIENCE**

***Inspection Engineer (Trainee), JC International, Peter Odili Road, Trans Amadi, Rivers State, Nigeria***  
**2019 - 2020**

Activities:

- Lifting gears/appliance inspection and Non destructive test (Magnetic Particle and Dye penetrate test) at Shelf Drilling Baltic Offshore Rig, during 2019 June Lifting gears Inspection Campaign.
- Carried out lifting gears inspection on marine vessels e.g. Boudreaux Tide at Onne dock, Port Harcourt.
- Assisted in the inspection of Lifting gears (Wire rope slings, Shackles, Pad eyes, Webbing Slings, Lever, Chain Hoist, CCU and Mobile Cranes etc) at Frank's International, SEFLAM, Borr Drilling, TOTAL etc.
- Underwent training on Basic Offshore Safety Induction Emergency Training (BOSIET), HSE, Lifting gears inspections and Non destructive tests.

## **EXTRACURRICULAR ACTIVITIES/ VOLUNTEERING SERVICES**

**Volunteer, International students Concerns Committee, Graduate Student Congress (GSC) –**  
**University of Kentucky** **Jan 2021-Present**

- Participated in the International panel for new international students into the University of Kentucky
- Participated in the University of Kentucky Graduate Community and Academic Transition Series (GradCATS)

**Nigeria Society of Chemical Engineers (NSChE) Students body** **2012-2017**

Student Member and National Vice president

- Participated and organized NSChE students conventions and congress
- Presented technical papers and articles for Chemical Engineering students consumption

## HONORS AND AWARDS

- 1st place University of Kentucky Sustainability Poster Presentation: Conversion of waste oils to renewable fuels over inexpensive catalysts. (2021)
- University of Kentucky nomination as Microteaching group leader for new graduate teaching assistants (Fall 2021 - Present)
- University of Kentucky Graduate Student Congress (UKGSC) ‘Pillars Award’ in recognition for the contribution towards creating a sense of community for graduate and professional students in the University of Kentucky (2021)
- University of Kentucky National Science Foundation Graduate Research Trainee In the Nexus of Food, Energy and Water Systems (INFEWS) (2020)
- Best undergraduate process plant design project (Panel 1), CHE, FUTO (2017)
- National *award of excellence* for “invaluable contribution and uplifting chemical engineering students in Nigeria”. By Nigeria Society of Chemical Engineers, Students Body. (2017)
- Best paper presentation on “fractional distillation of pyroligneous acid to obtain methanol as fuel-Future prospects” by Nigeria Universities Engineering Students Association (NUESA), FUTO. (2016)
- 3<sup>rd</sup> Most Influential student, dept. of chemical engineering, FUTO. (2015)

## RESEARCH PUBLICATIONS

1. **Great Umenweke**, Inioluwa Christianah Afolabi, Emmanuel I. Epelle, Jude A. Okolie, (2022). Harnessing the power of machine learning for modeling conventional and hydrothermal gasification of waste biomass – A comprehensive review. *Bioresource Technology Reports* (Manuscript under review)
2. Jude A. Okolie, Jorge Ivan Escobar, **Great Umenweke**, Waheed Khanday, Patrick U. Okoye (2022). Continuous biodiesel production: A review of advances in catalysis, microfluidic and cavitation reactors. *Fuel*, 307, 121821. <https://doi.org/10.1016/j.fuel.2021.121821>
3. Victor, Emmanuel, **Umenweke Great C**, and Ngozichukwu B. 2021. “The Role of Alkaline/Alkaline Earth Metal Oxides in CO<sub>2</sub> Capture: A Concise Review”. *Journal of Energy Research and Reviews* 9 (3), 46-64. <https://doi.org/10.9734/jenrr/2021/v9i3330235>
4. **Umenweke, G.**, Okoye, P. U., Okewale, A., Olotu, K., & Muniru, O. (2021). Trends in Sonochemical and Hydrodynamic Reactor Strategies for Catalytic Production of Biodiesel: Effects of the Influencing Process Parameters and Kinetics. *European Journal of Sustainable Development Research*, 5(3), em0164. <https://doi.org/10.21601/ejosdr/11002>
5. **Umenweke, G.\***, Adesanya, Z., Onyeaka, H. et al. Modular bio-refinery simulation of *Nesogordonia papaverifera* by fast pyrolysis (FP): a focus on bio-oil enhancement. *Biomass Conv. Bioref.* (2021). <https://doi.org/10.1007/s13399-021-01430-z>
6. **Umenweke, G.\***, Ighalo, J., Anusi, M., Itabana, B. and Ekeh, L. (2021). Selected Thermo-Chemical Biorefining: Evaluation of the Current Trends and Progressions. *European Journal of Sustainable Development Research*, 5(2), em0154. <https://doi.org/10.21601/ejosdr/10812>

7. Ighalo, J. O., Sagboye, P. A., **Umenweke, G.**, Ajala, O. J., Omoarukhe, F. O., Adeyanju, C. A., . . . Adeniyi, A. G. (2021). CuO nanoparticles (CuO NPs) for water treatment: A review of recent advances. *Environmental Nanotechnology, Monitoring & Management*, 15, 100443. doi: <https://doi.org/10.1016/j.enmm.2021.100443>
8. **Umenweke, Great**. Advancements in Biorefinery Processing. *Sci J Research & Rev.* 2(5): 2020. SJRR.MS.ID.000548. <https://doi.org/10.33552/sjrr.2020.02.000548>
9. Joshua O. Ighalo, Oluwaseun Jacob Ajala, **Great Umenweke**, Samuel Ogunniyi, Comfort Abidemi Adeyanju, Adewale George Adeniyi “Mitigation of Clofibric Acid Pollution by Adsorption: A Review of Recent Developments.” *Journal of Environmental Chemical Engineering* (2020) 104264 <https://doi.org/10.1016/j.jece.2020.104264>
10. Anusi M.O, **Umenweke G.C**, Nkuzinna O and Igboko N; “Kinetics Of Alkali Catalyzed Transesterification Reaction Of Palm Kernel Oil And physicochemical Characterization Of The Biodiesel Product” *American Journal of Engineering Research* (AJER), vol. 7, no. 2, 2018, pp. 73-82. <https://www.researchgate.net/publication/324797946>
11. Anusi M.O, **Umenweke G.C**, Oyoh K.B, Nkuzinna .O, Njoku C.N; “Characterization of Non-Edible Oil from Waste Plant Materials for Biodiesel Production” *American Journal of Engineering Research* (AJER), vol. 7, no. 4, 2018, pp.32-36. <https://www.researchgate.net/publication/324798033>

## BOOK CHAPTER

1. Oluwaseun J. Ajala, A. Khadir, Joshua O. Ighalo, **Great Umenweke**. “Cellulose-based nanobiosorbents in water purification.” *Nano-biosorbents for Decontamination of Water, Air, and Soil Pollution* (2022). <https://doi.org/10.1016/B978-0-323-90912-9.00017-4>

## PRESENTATIONS

- (1) University of Kentucky Food, Energy and Water (FEW) Symposium (Dec. 9<sup>th</sup>, 2021)

Presenter: Great Umenweke, Eduardo Santillan-Jimenez and Mark Crocker

“Support effects of Ni-catalysts promoted with Fe or Cu in the catalytic deoxygenation of tristearin to fuel-like hydrocarbons.”

- (2) University of Kentucky Sustainability Poster Competition (Oct. 1<sup>st</sup>, 2021)

Presenter: Great Umenweke and Eduardo Santillan-Jimenez

“Conversion of waste oils to renewable fuels over inexpensive catalysts” – 1<sup>st</sup> Place Graduate Poster Competition

## RESEARCH GRANT AWARDS

University of Kentucky National Science Foundation Graduate Research Traineeship (UK NRT) In the Nexus of Food Energy and Water Systems (InFEWS): Co-PI of \$16,000 award grants on the valorization of forest residues to improve economic viability for Biorefineries. **(2021)**

## REFEREES

1. Dr. Eduardo Santillan-Jimenez

Adjunct Assistant Professor and Program Manager, Center for Applied Energy Research, University of Kentucky, Lexington, Kentucky esant3@uky.edu

2. Dr. Mark Crocker

Professor of Chemistry (Emeritus) and Former Associate Director, Center for Applied Energy Research, University of Kentucky, Lexington, Kentucky mark.crocker@uky.edu

3. Dr. Helen Onyeaka

Lecturer and Program Director, Department of Chemical Engineering, University of Birmingham, London h.onyeaka@bham.ac.uk +447957625167

4. Dr. Rafael Luque

Professor of Chemistry, Universidad de Córdoba, Spain and Director of the Center for Molecular Design and Modern Organic Chemistry at RUDN University in Moscow, Russia; Editor-in-chief Molecular Catalysis-Elsevier (q62alsor@uco.es)

5. Dr. Ezinne Achinivu

Assistant Professor of Green Chemistry and Engineering, Department of Chemical Engineering, University of Illinois, Chicago and AAAS Science Technology Policy Fellow (Department of Energy - Advanced Manufacturing Office) (achinivu@uic.edu)