Dr. Michael O. Eze (Ph.D. Dr.rer.nat.)

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Education and appointments

Missouri University of Science and Technology, Rolla, MO, USA

Assistant Professor of Bioanalytical & Environmental Chemistry, August 21, 2023 – Present

- Head of the Metabolomics and Environmental Toxicology Laboratory
- Developing MS-based metabolomics methods for animal and plant disease diagnosis
- Characterizing organismal exposure to, and toxicity of environmental contaminants
- Innovating ecofriendly remediation approaches for organic and inorganic pollutants
- Teaching and supervising PhD students and postdoctoral scholars

University of California, Davis, CA, USA

Postdoctoral Fellow, Analytical Chemistry & Metabolomics, April 1, 2022 – September 14, 2023

- Mass spectrometry-based profiling of metabolomic content of complex samples (including breath, serum, blubber, plant tissue, soil, and water)
- Investigating the fate, transport, and accumulation of persistent organic pollutants (POPs) in aquatic organisms such as whales and dolphins in St Kitts Islands
- Identifying biomarkers of citrus HLB disease, and assessing the effectiveness of therapeutics (in collaboration with the UF, Texas A&M, and Bayer R&D)

Macquarie University, Sydney, Australia

Ph.D. in Analytical & Organic Geochemistry, August 2021

- Environmental analysis for contaminant identification and quantification
- Examined the effect of physicochemical properties on pollutant transport
- Dose-response analysis of contaminant phytotoxicity using R language

Georg-August University of Goettingen, Germany

Dr.rer.nat. in Biology (German Ph.D. equivalent) with Magna cum laude, June 2021

- Overall grade of 1.00 (the highest possible grade in the German grading system)
- Developed eco-friendly methods for the remediation of environmental pollutants
- Supervised bachelor and master's students

Abubakar Tafawa Balewa University, Bauchi, Nigeria

PGDip. in Management, June 2016

- Human resources management including supervision and teambuilding
- Budgeting, financial and project management principles

Abubakar Tafawa Balewa University, Bauchi, Nigeria

M.Sc. in Analytical Chemistry, February 2015

- Phytoremediation of heavy metals, and assessment of mobility in vegetable plants

Usmanu Danfodiyo University, Sokoto, Nigeria

PGDip. in Education with Distinction, March 2012

- Acquisition & demonstration of pedagogical skills (Licensed by NESA Australia)

University of Nigeria, Nsukka, Nigeria

B.Sc. (Honours) in Pure and Industrial Chemistry, February 2006

- Analytical, environmental, organic, inorganic, physical, and polymer chemistry

Relevant instrumentation and data analytical skills

- Operation and maintenance of GC-MS, Orbitrap GC, GC-QQQ, LC-MS, and LC-QToF
- Chemometric analysis on MS datasets using regression and discriminant techniques to test diagnostic capabilities of biological assays (PCA, PLS, PLS-DA, nMDS)
- Metabolomics analysis for biomarker discovery
- Dose-response analysis in ecotoxicology using R language

Publications (*Corresponding author; †Contributed equally)

1. Unagwu, B.O., Odu, C.F., Amuji, C.F., ***Eze, M.O.,*** Ebido, N.E., Abara, C.U., Igboka, C.R. and Chukwudi, U.P. (2025). The influence of black soldier fly residue on watermelon growth and the properties of a coarse-textured ultisol. *Soil System* **9,** 43. doi.org/10.3390/soilsystems9020043.
2. Kafeenah, H. and ***Eze, M.O.** (2025). Trends in volatile organic compound-based metabolomics for biomarker discovery. *Microchemical Journal,* **213,** 113700. doi.org/10.1016/j.microc.2025.113700.
3. ***Eze, M.O.** and Amuji, C.F. (2024). Elucidating the significant roles of root exudates in organic pollutant biotransformation within the rhizosphere. *Scientific Reports,* **14**, 2359. doi.org/10.1038/s41598-024-53027-x.
4. †McCartney, M.M., **Eze, M.O.**, Borras, E., Edenfield, M., Batuman, O., Manker, D.C., da Graca, J.V., Ebeler, S.E. and *Davis, C.E. (2024). A metabolomics assay to diagnose citrus Huanglongbing (HLB) disease and to aid assessment of treatments to prevent or cure infection. *Phytopathology*, **114**, 84-92. doi.org/10.1094/PHYTO-04-23-0134-R.
5. Ishieze, P.U., Amuji, C.F., Ugwuoke, K.I., Baiyeri, P.K. and ***Eze, M.O.** (2023). Comparative efficacy of systemic and combination fungicides for the control of Alternaria leaf spot of cabbage. *Applied Microbiol*., **3**, 906-914. doi.org/10.3390/applmicrobiol3030062.
6. Udume, O.A., Abu, G.O., Stanley, H.O., Vincent-Akpu, I.F., Momoh, Y. and ***Eze, M.O.** (2023). Biostimulation of petroleum-contaminated soil using organic and inorganic soil amendments. *Plants,* **12**, 431. doi.org/10.3390/plants12030431.
7. ***Eze, M.O.**, Thiel, V., Hose, G.C., George, S.C. & Daniel, R. (2022). Bacteria-plant interactions synergistically enhance biodegradation of diesel fuel hydrocarbons. *Communications Earth & Environment*, **3**, 192. doi.org/10.1038/s43247-022-00526-2.
8. ***Eze, M.O.** and George, S.C. (2022). The potential of oxygenates to increase the risk of exposure to polycyclic aromatic hydrocarbons through groundwater contamination. *Water,* **14**, 739. doi.org/10.3390/w14050739.
9. ***Eze, M.O.**, Thiel, V., Hose, G.C., George, S.C. and Daniel, R. (2022). Enhancing rhizoremediation of petroleum hydrocarbons through bioaugmentation with a plant growth-promoting bacterial consortium. *Chemosphere,* **289**, 133143. doi.org/10.1016/j.chemosphere.2021.133143.
10. ***Eze, M.O.**, George, S.C. and Hose, G.C. (2021). Dose-response analysis of diesel fuel phytotoxicity on selected plant species. *Chemosphere,* **263**, 128382. doi.org/10.1016/j.chemosphere.2020.128382.
11. ***Eze, M.O.**, Hose, G.C., George, S.C. and Daniel, R. (2021). Diversity and metagenome analysis of a hydrocarbon-degrading consortium from asphalt lakes located in Wietze, Germany. *AMB Express,* **11**, 89. doi.org/10.1186/s13568-021-01250-4.
12. ***Eze, M.O.** (2021). Metagenome analysis of a hydrocarbon-degrading bacterial consortium reveals the specific roles of BTEX biodegraders. *Genes,* **12**, 98. doi.org/10.3390/genes12010098.
13. **Eze, M.O.**, Lütgert, S.A., Neubauer, H., Balouri, A., Kraft, A.A., Sieven, A., *Daniel, R. and Wemheuer, B. (2020). Metagenome assembly and metagenome-assembled genome sequences from a historical oil field located in Wietze, Germany. *Microbiology Resource Announcements,* **9**, 21. doi.org/10.1128/MRA.00333-20.

14. ***Eze, M.O.**, Hose, G.C. and George, S.C. (2020). Assessing the effect of diesel fuel on the seed viability and germination of *Medicago sativa* using the event-time model. *Plants,* **9**, 1062. doi.org/10.3390/plants9091062.
15. ***Eze, M.O.** and George, S.C. (2020). Ethanol-blended petroleum fuels: implications of co-solvency for phytotechnologies. *RSC Advances*, **10**, 6473-6481. doi.org/10.1039/C9RA10919F.
16. ***Eze, M.O.** (2015). Effect of solid waste source (dumpsite type) on heavy metal contaminations in urban soils of Bauchi, Nigeria. *American Chemical Science Journal*, **9**, 1-14. doi.org/10.9734/ACSJ/2015/18039.
17. ***Eze, M.O.** and Ekanem, E.O. (2014). Bioaccumulation and mobility of cadmium (Cd), lead (Pb) and zinc (Zn) in green spinach grown on dumpsite soils of different pH levels. *Bulletin of Environment Pharmacology and Life Sciences.* **4**, 85-91.
18. ***Eze, M.O.** (2014). The relationship between soil physico-chemical properties and concentrations of selected heavy metals (Cd, Pb, Ni, Fe, Zn) in *Amaranthus hybridus*. *Australian Journal of Chemistry*.

Selected conference presentations (‡Oral presentation; §Graduate student)

- §Taiwo, M.D., Kafeenah, H. and **Eze, M.O**. (2025). *Bioaccumulation patterns of PFAS in tissues of grass carp*. ACS 2025 Spring Conference, San Diego, CA. March 23-7, 2025.
- ‡**Eze, M.O.,** McCartney, M.M., Borras, E. and Davis, C.E. (2023). *Metabolomics predictors of vigor in citrus and their application to analyze therapeutic efficacy against Huanglongbing (HLB)*. 5th Annual Metabolomics Association of North America (MANA) Conference. Columbia, MO, USA. October 23-27, 2023.
- ‡McCartney, M.M., **Eze, M.O.**, Borras, E. and Davis, C.E. (2023). *Use of metabolomics to diagnose plant diseases and to evaluate potential therapeutics or preventions: a citrus HLB case study*. 12th International Congress of Plant Pathology. Lyon, France. August 20-25, 2023.
- ‡**Eze, M.O.** (2022). *Metagenome analysis of a hydrocarbon-degrading bacterial consortium from a historic oil site in Wietze, Germany*. ASM Microbe, Washington D.C., USA. June 9-13, 2022.
- ‡**Eze, M.O.** (2021). *Metagenomic insight into the metabolic activities of potential BTEX-degrading populations*. 30th IMOG, Montpellier, France. September 12-17, 2021.
- ‡**Eze, M.O.** (2021). *Rapid Fire Presentation: Plants and Microbes Unite to Clean Up Oil Spills*. Australian Earth Sciences Convention (Online). February 9-12, 2021.
- ‡**Eze, M.O.**, George, S.C. and Hose, G.C. (2020). *Modelling hormesis in rhizoremediation of petroleum contaminated sites*. AAPG 2020 Annual Convention and Exhibition (Online). September 29 – October 1, 2020.
- ‡**Eze, M.O.**, George, S.C., Hose, G.C., Daniel, R. and Wemheuer, B. (2020). *Metagenomic insight into a diesel-degrading consortium for the bioremediation of diesel fuel-contaminated sites*. RSC EnvChem2020 Conference. July 9-10, 2020.
- ‡**Eze, M.O.**, George, S.C. and Hose, G.C. (2019). *The potential of Medicago sativa for microbial-enhanced phytoremediation of diesel fuel contaminated sites*. AAPG 2019 International Conference and Exhibition (ICE), Buenos Aires, Argentina. August 27-30, 2019 (awarded *Best International Student Presenter*).
- ‡**Eze, M.** and Ekanem, E. (2019). *Potential of Amaranthus hybridus for remediation of heavy metals*. Goldschmidt 2019 Conference, Spain. August 18-23, 2019.
- **Eze, M.O.** and George, S.C. (2019). *Ethanol-blended fossil fuel: is reduction of atmospheric pollution the only concern?* SETAC Europe 29th Annual Meeting, Helsinki, Finland. May 26-30, 2019.
- ‡**Eze, M.** and George, S. (2018). *Effect of ethanol addition on vertical migration of diesel fuel: implications for phytoremediation*. 20th Australian Organic Geochemistry Conference (AOGC), Canberra, Australia. December 3-7, 2018.

Invited (technical) talks

- **Eze, M.O.** (2022). *Saving our planet through science*. Department of Earth & Planetary Sciences, University of California Davis, Davis, California, USA.
- **Eze, M.O.** and McCartney, M. (2022). *Metabolomics: a window into cellular and biochemical processes*. Bayer Crop Science, Sacramento, California, USA.
- **Eze, M.O.** (2019). Petroleum Exploration Society of Australia (PESA) NSW March 2019 Technical Meeting. The Castlereagh Boutique Hotel, Sydney, Australia.

Nontechnical science communication-based presentations

- 2022: ASM Microbe Rapid Fire Presentation
- 2021: Runner-Up, Australian Earth Science Convention Rapid Fire Presentation
- 2019: 1st Place Award for Early Career Researcher Prize, Sparrow, United Kingdom (I was the winner among finalists from more than 70 countries).
- 2018: Faculty Runner-Up, 3MT Competition, Macquarie University, Sydney
- 2018: 1st Place Award, 3MT Competition, Earth & Env. Sciences, Macquarie University
- 2018: Continental Finalist, Falling Walls Lab Australia

Research grants, awards, and recognition (>US$ 700,000)

- 2025: Missouri S&T Spring 2025 Ignition Grant ($30,000)
- 2025: Center for Science, Technology and Society Mini-Grant ($2,000)
- 2024: Center for Biomedical Research Seed Grant ($10,000)
- 2023: "Extraordinary Professor" recognition for sustained national and international acclaim
- 2023: Early Career Travel Award by the Metabolomics Association of North America ($800)
- 2023: Travel Grant for Early Career Scientists, Royal Society of Chemistry, London, UK ($650)
- 2023: Sponsored Open Access Publishing Fee for Invited Articles in *Plants* (Q1) ($2,500)
- 2023: Sponsored Open Access Publishing Fee for Invited Articles in *Applied Microbiology* ($1,100)
- 2022: *Environments* Journal Travel Award, MDPI, Basel, Switzerland ($500)
- 2022: Postdoctoral Fellowship, University of California, Davis, US (>$200,000)
- 2022: Researcher Development Grant, Royal Society of Chemistry, London, UK ($700)
- 2021: Merrill W. Haas Memorial Grant, American Association of Petroleum Geologists ($3,000)
- 2021: Researcher Development Grant, Royal Society of Chemistry, London ($350)
- 2021: Australian Earth Science Convention Grant, Australia ($500)
- 2020: Bernold M. Hanson Memorial Environmental Grant, AAPG Foundation, US ($3,000)
- 2019: Otto Bayer Fellowship, Bayer Science & Education Foundation, Germany ($21,200)
- 2019: Carlos Walter Campos Memorial Award for the Best International Student Paper, US ($500)
- 2019: Travel Grant for PhD Students & Early Career Scientists, Royal Society of Chemistry ($850)
- 2019: Postgraduate Research Fund, Macquarie University, Sydney, Australia ($5,000)
- 2019: Cotutelle Research Excellence Scholarship, Macquarie University, Sydney ($214,792)
- 2019: Travel Grant, European Association of Geochemistry ($2,680)
- 2019: DAAD Scholarship for Cotutelle PhD, German Academic Exchange Service ($48,850)
- 2018: Tertiary Institution Research Grant, PESA Australia ($1,000)
- 2017: Research Training Program (iRTP) Scholarship, Australian Government ($200,876)

Featured popular media

- St. Loui Public Radio: "Missouri S&T researcher finds forever chemicals in St. Louis-area fish" Forever chemicals found in St. Louis-area carp and catfish | STLPR
- Nature Earth & Environment Community "Behind the Paper" Blog article: Bacteria-plant interactions synergistically enhance biodegradation of diesel fuel hydrocarbons | Research Communities by Springer Nature

- Royal Society of Chemistry, London: RSC Advances HOT articles – a feature interview with Michael Eze – RSC Advances Blog
- AAPG International Award: https://www.aapg.org/about/aapg/overview/honors-and-awards/association/student-international-awards/campos
- Sparrho, United Kingdom: https://digest.sparrho.com/community/introducing-our-october-500-researcher-prize-winner
- Sparrow Science, London, United Kingdom: Feature Interview https://www.sparrow.science/plants-and-microbes-unite-to-clean-up-oil-spills
- Australian Academy of Science (AAS): https://www.science.org.au/news-and-events/events/international-events/falling-walls-lab-australia

Memberships and professional affiliations

- Royal Society of Chemistry
- American Chemical Society
- Metabolomics Association of North America
- Society of Environmental Toxicology and Chemistry
- American Society for Microbiology

International committees/Expert panel

- Expert Reviewer, Royal Society of Chemistry Research Fund & ECR Grants, UK.
- Expert Panel, National Science Centre (NCN) Poland OPUS (NCN ID: 2022-234055) I served in Panel NZ8 of the NCN, which is the largest grant-awarding body of the Polish Government, similar to National Science Foundation (NSF) panels in the US.
- Organizing Committee (*Program and Abstracts*), HDR Conference, Sydney, Australia. November 2018.

Mentorship activities

- *Higher Degree Research Mentor,* Macquarie University, Sydney, Australia.

Peer review activities

- Editorial Board, *Discover Chemistry,* Springer Nature
- *Nature Scientific Reports* (IF: 4.6; Publisher: Nature Portfolio)
- *RSC Advances* (IF: 4.036; Publisher: Royal Society of Chemistry)
- *Royal Society Open Science* (IF: 3.653; Publisher: The Royal Society)
- *Environmental Science & Pollution Research* (IF: 5.190; Publisher: Springer Nature)
- *Microbial Ecology* (IF: 4.192; Publisher: Springer Nature)
- *Science of the Total Environment* (IF: 10.753; Publisher: Elsevier)
- *Chemosphere* (IF: 8.800; Publisher: Elsevier)
- *Journal of Hazardous Materials* (IF: 13.600; Publisher: Elsevier)
- *Environmental Pollution* (IF: 8.900; Publisher: Elsevier)
- *Water Research* (IF: 13.400; Publisher: Elsevier)
- *Water* (IF: 3.530; Publisher: MDPI)
- *International Journal of Environmental Research & Public Health* (IF: 4.614)
- *Agronomy* (IF: 3.949; Publisher: MDPI)
- *Remediation* (IF: 2.087; Publisher: John Wiley & Sons)
- *3 Biotech* (Publisher: Springer Nature)
- *Toxics* (IF: 4.472)