

John Arigbede

PhD Candidate · Transition-Metal Carbides · High-Pressure Synthesis · Computational Materials Science
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RESEARCH PROFILE

PhD candidate in the Walsh Group at UMass Amherst, studying structural, catalytic and magnetic properties of transition-metal carbides under extreme pressure. Current work centers on Mn–C systems, combining DFT calculations (VASP) on the UMass HPC cluster with experimental synthesis and X-ray diffraction to characterize pressure-induced phase behavior.

EDUCATION

PhD, Chemical Engineering University of Massachusetts Amherst · Advisor: Prof. James P.S. Walsh	Expected 2028
M.Sc., Chemical Engineering University of Massachusetts Amherst	Feb. 2026
B.Tech (Honors), Industrial Chemistry Olusegun Agagu University of Science & Technology (OAUSTECH), Nigeria	Nov. 2019

RESEARCH EXPERIENCE

Graduate Researcher — Walsh Group, UMass Amherst Jan. 2023 – Present
Advisor: Prof. James P.S. Walsh · Department of Chemical Engineering

- ▶ Design and carry out high-pressure synthesis routes for transition-metal carbides, including sample preparation, multi-anvil press operation, and XRD-based phase verification.
- ▶ Build and run DFT calculation workflows (VASP, SLURM) on the UMass HPC cluster to map structural and magnetic phase behavior of Mn–C and related carbide systems across a range of applied pressures.
- ▶ Developed Python automation scripts to parse VASP output files (OUTCAR, OSZICAR) across large calculation sets, replacing manual file-by-file review with systematic convergence and energy tracking.

Graduate Research Assistant — Industrial Chemistry Lab, OAUSTECH Sept. 2019 – Jun. 2022
Advisor: Prof. Vincent O. Akpoveta

- ▶ Co-authored studies on AACVD deposition of Al-doped ZnO thin films; performed XRD, optical, and electrical characterization as a function of Al content and carrier gas, contributing to 2 publications.
- ▶ Designed and executed crude oil soil remediation studies, optimizing pH, temperature, and surfactant concentration conditions and characterizing remediation kinetics.
- ▶ Isolated silica from five agricultural waste sources and evaluated suitability for soil remediation applications.

PEER-REVIEWED PUBLICATIONS

Accepted / In Press

1. Cote, E. E., Nelson, T. L., Ambos, S. D., **Arigbede, J.**, Walsh, C., Bernard, R. E., Brooks, H. L., Whitaker, M. L., & Walsh, J. P. S. (2026). **High-pressure synthesis of a novel body-centered tetragonal vanadium carbide.** *Chemistry – A European Journal* (accepted)

Published

2. Akpoveta, V. O., Umudi, E. Q., Ogbolu, B., Afure, M. A., **Arigbede, J.**, & Thomas, J. O. (2026). **A remediation approach for the petroleum industry using optimized biodegradable SDS-surfactant in the treatment of kerosene-contaminated soil.** *Environmental Challenges*, 22, 101388. doi:10.1016/j.envc.2025.101388
3. **Arigbede, J.**, Akpoveta, V., Umudi, Q., Ekwe, C. O., & Ojuloge, O. (2025). **Material characterization and process optimization of natural silica isolated from Nigerian beach sand for crude oil-contaminated soil remediation.** *Remediation*, 36(1). doi:10.1002/rem.70044
4. Imoni-Ogbe, K., Osiele, O. M., Akpoveta, V., Ekpeko, A., Onajite, O., & **Arigbede, J.** (2025). **Enhanced characterization of Al-doped ZnO thin films via AACVD using oxygen as carrier gas.** *Discovery Materials*, 5, 112. doi:10.1007/s43939-025-00284-w
5. Imoni-Ogbe, K., Osiele, O. M., Akpoveta, V., Ekpeko, A., Onajite, O., & **Arigbede, J.** (2025). **Fabrication of Al-doped ZnO thin films using nitrogen as carrier gas in AACVD.** *Nigerian Journal of Pure & Applied Science*, 38. doi:10.48198/NJPAS/25.A05
6. Marshall, P. V., Thiel, S. D., Cote, E. E., **Arigbede, J.**, Whitaker, M. L., & Walsh, J. P. S. (2024). **High-pressure synthesis and recovery of single crystals of the metastable manganese carbide, MnC_{x-1}.** *Chemistry – A European Journal*. doi:10.1002/chem.202401581
7. Akpoveta, V. O., Fasasi, M. A., & **Arigbede, J.** (2023). **Epoxidation of melon seed (*Citrullus colocynthis* L) oil: A kinetic and thermodynamic approach for industrial applications.** *Nigerian Journal of Pure & Applied Science*, 36(1), 4481. doi:10.48198/NJPAS/22.B06
8. Akpoveta, O., **Arigbede, J.**, & Obielumani, J. (2022). **Green waste-derived alkali for remediation of heavy metals in contaminated groundwater: kinetics evaluation.** *Journal of the Chemical Society of Nigeria*, 47(3). doi:10.46602/jcsn.v67i3.755
9. Osarodion, O. P., Hassan, A., & **Arigbede, J.** (2022). **Electron bombardment photodisintegration spectrum analysis of a 3-amino-6-methoxy-2-methylquinazolin-4(3H)-one derivative.** *American Journal of Materials Synthesis & Processing*, 7(1), 8–14. doi:10.11648/j.ajmsp.20220701.12

SELECTED PRESENTATIONS

National Organization for Black Chemists and Chemical Engineers — Oral Presentation Sept. 2024
Investigating the Catalytic Properties of a Novel Anti-NiAs-type Manganese Carbide

American Chemical Society Northeastern Regional Meeting — Oral Presentation Jun. 2023
High-Pressure Synthesis and Structural Characterization of Transition-Metal Carbides

Chemical Society of Nigeria Conference — Oral Presentation Mar. 2022
Oil Exploration in the Niger Delta: Impact on National Development

HONORS, FELLOWSHIPS & AWARDS

Commitment to Diversity Award 2026
Graduate Students of Color Association & UMass Amherst Graduate School · Selective annual award recognizing one graduate student for outstanding contributions to diversity and inclusion in the graduate community. Honored at Doctoral Hooding Ceremony, May 2026.

Leadership Fellowship for Graduate Students 2025
UMass Amherst Graduate School · NSF-supported fellowship providing inclusive leadership training for the next generation of academic leaders. Selected from the UMass Amherst graduate student body.

Top Wing Award for Excellence in Teaching Chemistry 2023
Department of Chemistry, UMass Amherst

Most Outstanding Student Award 2019
Department of Industrial Chemistry, OAUSTECH

LEADERSHIP & SERVICE

President — Graduate Student Government, UMass Amherst

Jun. 2024 – Present

Member — Strategic Planning: Research & Creative Activity Group, UMass Amherst

Feb. 2024 – Present

Vice President — NOBCChE, UMass Amherst Chapter

Mar. 2023 – Present

TECHNICAL SKILLS

Computational: VASP (DFT), VASPkit, SLURM/HPC cluster workflows, Python (NumPy, Pandas, custom output-parsing scripts).

Experimental: High-pressure synthesis (multi-anvil press), powder and single-crystal XRD, AACVD thin film deposition, Soxhlet extraction, thermal stability profiling, soil remediation characterization

PROFESSIONAL MEMBERSHIPS

National Organization for Black Chemists and Chemical Engineers (NOBCChE) · American Chemical Society (ACS) · Society of Chemical Industries, Canada · Student Chemical Society of Nigeria (SCSN, Grad)