DARKEY SILVANUS JUNIOR

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EDUCATION

Virginia Tech | Aug. 2023 – Present

Ph.D Chemical Engineering

Kwame Nkrumah University of Science and Technology | Sep. 2018 – Aug. 2022

B.Sc. Chemical Engineering

RESEARCH EXPERIENCE

Virginia Tech

Research Assistant, Xin Group| Nov. 2023 – Present

- Using data and a computational driven approach to inversely design high-entropy alloys (HEAs) to serve as catalyst for carbon dioxide reduction reaction.
- This study is done by using density functional theory (DFT) calculations to generate HEA dataset. By employing a generative diffusion model, novel HEA compositions are discovered which can serve as catalyst to drive carbon dioxide reduction reaction.

Research Assistant, Prof. Luke Achenie's Lab | Nov. 2022 – Aug. 2023

- Conducted atomic-level and coarse-grained (CG) molecular dynamics (MD) simulations to study the behavior of Doxorubicin in lipid bilayers.
- Analyzed simulation data to understand drug interactions with lipid membranes, contributing to a deeper understanding of drug delivery mechanisms.

Kwame Nkrumah University of Science and Technology

Lead Student Researcher | Jan. 2022 – Aug. 2022

Thesis Title: Plant Design for the Production of Biolubricant from Waste Vegetable Oils
Advisor: Dr. Ohemeng-Boahen Godfred, PhD
Synopsis: Aims to find an alternative to petroleum-based lubricants due to the depletion of crude oil reserves and its effect on the climate. To achieve this, I designed a process plant to convert waste vegetable oils to biolubricants by simulating the process plant using ASPEN hysys.
Duties: Reviewed literature on biolubricants, designed process flowsheet using MS Visio, performed economic analysis using excel, and performed material and energy balances using ASPEN hysys.

Lead Student Researcher | Jan. 2021 – Sep. 2021

Project Title: Scaling-up Cyanide Degradation Process
Advisor: Prof. Lawrence Darkwah, PhD
Synopsis: The purpose of this study was to see how well microorganisms breakdown cyanide compounds in tailing fluid produced during gold ore cyanidation. The findings revealed that increased microbial populations, a moderate level of dissolved oxygen, and a pH in the alkaline area facilitated a faster rate of cyanide compound detoxification.
Duties: Reviewed literature, performed laboratory bench-scale experiments including titration, pH checking, and measurement of dissolved oxygen concentration in cyanide-bacterial solution.

TEACHING EXPERIENCE

Teaching Assistant – Fluid Transport , Virginia Tech| Aug. 2023 – Dec. 2023

- Provided academic support by conducting review sessions, offering one-on-one tutoring, and assisting with homework assignments and projects.
- Responsible for grading assignments and exams.

TEACHING EXPERIENCE

Teaching Assistant - Mass Transfer Processes, KNUST| Nov. 2022 - Aug. 2023

- Facilitated laboratory sessions by preparing equipment, demonstrating procedures, and guiding students through experiments.
- Held weekly office hours to provide academic support to undergraduate students.

INDUSTRIAL EXPERIENCE

Quality Control Intern, Aspee Pharmaceutical Company Limited | Sep. 2021 – Nov. 2021

- Performed qualitative tests on raw materials
- Determined assay concentration using high-performance liquid chromatography (HPLC)
- Analysed laboratory results obtained after each qualitative test

AWARDS & SCHOLARSHIPS

- Tullow Ghana Scholarship – Full Undergraduate Scholarship | Sep. 2018 – Aug. 2022
- Best Project of the Year , Department of Chemical Engineering | Sep. 2021

LEADERSHIP & SERVICE

Head of Trade, Technology & Innovations (TRATECH) | Jan. 2021 – Sep. 2021

- Responsible for the day-to-day innovation activities of the department
- Organized skill training in MATLAB, ASPEN Plus, Hysys and Chemcad

CONFERENCES ATTENDED

- Southeastern Catalysis Society (SECS) Conference | Feb. 2024
- Chemical Engineering Graduate Student Association Symposium| Apr. 2024
- Micro Reaction Calorimetry Application for the Chemical Industry | Oct. 2022
- 11th International Conference on Biomolecular Engineering | Nov. 2021

VOLUTEERING

EUvsVirus Hackathon Participant, trustinscience.org |Jun. 2020

- Collaborated with 11 individuals from Europe to develop the *"Trust In Science" app* which educates individuals on research integrity during Covid-19 pandemic
- Provided individuals with information on how to mitigate fake news during Covid-19 pandemic

AfricavsVirus Hackathon Participant | Jun. 2020

- Worked with 4 members from various African countries to develop a system that reduced post-harvest losses and safely transported farm products to homes and markets during the Covid-19 pandemic

RELEVANT SKILLS

- Python and Jupyter notebook
- Matlab
- Density Functional Theory (DFT)
- ASPEN plus and ASPEN hysys
- Microsoft Suite (MS Word, MS Excel and MS Visio)
- AutoCAD
- COPASI (Simulation of molecules, modeling of chemical and biological systems)
- Large-scale Atomic/Molecular Massively Passive Simulator (LAMMPS)
- GROMACS

AFFILIATIONS

- Chemical Engineering Graduate Student Association ChEGSA, Virginia Tech
- National Society of Black Engineers (NSBE)
- American Institute Of Chemical Engineers (AIChE)
- Afrisnet: Africa STEM Network
- College of Engineering Innovation Centre, KNUST
- Ghana Engineering Student' Association (GESA)
- Chemical Engineering Student' Association (CHEESA)