

Choonzo Chiyumba MRSC

Chemist — Synthetic & Medicinal Chemistry

Cambridge, United Kingdom | choonzo.chiyumba@icloud.com | linkedin.com/in/choonzo-nachoo-be-chiyumba-188270156/

PROFILE

PhD chemist (thesis submitted August 2026; viva pending) with a doctoral research programme built around designing and synthesising novel chemical targets and building structure-function insight from them. Practical experience spans multi-step organic and organometallic synthesis, synthetic methodology development (metalation and functionalisation chemistry), and full analytical characterisation of synthesised targets by NMR, HPLC, HRMS, UV-Vis, and fluorescence spectroscopy. MSc research independently established structure-activity relationships across a 15+ compound analogue series through systematic biological evaluation. Comfortable troubleshooting low-yielding, side-reaction-prone synthetic steps and working independently within a milestone-driven programme; three peer-reviewed publications. MRSC member. Available immediately following the viva.

TECHNICAL SKILLS

- **Synthesis:** Multi-step organic and organometallic synthesis · Synthetic methodology development · Metalloporphyrin synthesis (Ir, Zn, Co) · Metalation and functionalisation chemistry · Parallel analogue synthesis and scaffold diversification
- **Structure-Function & SAR:** Structure-activity relationship analysis across compound series · Design of novel chemical targets · Protein-small molecule bioconjugation and cofactor binding
- **Analytical Characterisation:** NMR (^1H , ^{13}C , 2D) · HPLC (RP, analytical) · HRMS · UV-Vis titration · Fluorescence spectroscopy · IR · Singlet oxygen quantum yield determination
- **Research Practice:** Independent experimental design and troubleshooting · Reproducible protocol development and documentation · Scientific manuscript preparation for peer review

EDUCATION

PhD, Chemistry, University of Cambridge, Oct 2022 – 2026 (thesis submitted Aug 2026; viva pending)
Fully Cambridge Trust-funded. Thesis: *Exploring Synthetic Porphyrin-Protein Conjugates as New Artificial Metalloenzymes*. Supervised by Prof. Boss and Prof. Barker.

MSc, Chemistry (1st Class), Rhodes University, Feb 2021 – Oct 2022
Fully NRF South Africa-funded. Thesis: *Photodynamic Anticancer and Antimicrobial Activities of π -Extended BODIPY Dyes and Cationic Mitochondria-Targeted Porphyrins*.

BSc Honours, Chemistry (1st Class), Rhodes University, Feb 2020 – Nov 2020

BSc, Chemical Biology, University of Zambia, Feb 2012 – Nov 2016

Awards: Best graduating BSc Honours student (Dean's Colours) · Bronze Medal, South African Chemical Society · 2nd Prize, 3-Minute Thesis

RESEARCH EXPERIENCE

PhD Researcher — Synthetic & Bio-Inorganic Chemistry, University of Cambridge, Oct 2022 – present

- **Designed and synthesised novel metalloporphyrin cofactors** (Ir(III), Zn(II), Co(II)) as synthetic targets to activate engineered protein scaffolds, developing and optimising metalation and functionalisation methodology and troubleshooting low-yielding, side-reaction-prone steps.
- **Built structure-function insight into protein-cofactor assembly** by designing and running a quantitative binding-characterisation pipeline (UV-Vis titration, fluorescence spectroscopy) across a four-porphyrin panel.
- **Independently synthesised and characterised a 25+ compound substrate library** (15 exocyclic methylene, 10 diazine scaffolds) by NMR and HRMS, planning and executing multi-step routes and purification across a fast-paced, multi-compound programme.
- **Co-authored a cobalt porphyrin catalysis study** (Inorg. Chem., 2022), synthesising and characterising the metal-coordinated catalyst series and building structure-function insight into how substituent effects tune catalytic activity.
- **Communicated synthetic and structure-function data to international scientific audiences** at three conferences (Kenya, Canada, Switzerland) after securing £2,500 in competitive RSC funding.

MSc Researcher — Synthetic & Medicinal Chemistry, Rhodes University, Feb 2021 – Oct 2022

- **Designed and independently synthesised 15+ novel chemical targets** via multi-step condensation, halogenation, and quaternisation chemistry (π -extended BODIPY dyes and cationic porphyrins), generating a structurally diverse analogue series.
- **Built a full structure-activity relationship profile** across the series through systematic biological evaluation against *E. coli* and cancer cell lines, establishing halogenation and cationic charge as the primary structural determinants of activity, with complete analytical characterisation by NMR, UV-Vis, HPLC, and fluorescence spectroscopy (J. Porphyrins Phthalocyanines, 2022).

PUBLICATIONS

Y. Wei, L. Zhao, R. Yuan, Z. Xue, J. Mack, C. Chiyumba, T. Nyokong and J. Zhang, "Promotion of Catalytic Oxygen Reduction Reactions: The Utility of Proton Management Substituents on Cobalt Porphyrins", *Inorganic Chemistry*, 2022, 61, 13085–13095. <https://doi.org/10.1021/acs.inorgchem.2c01591>

Contribution: synthesised and characterised the cobalt porphyrin catalyst series underpinning the study.

A. K. May, C. Chiyumba, J. Harris, J. Mack and T. Nyokong, "Photodynamic antimicrobial activities of halogenated 3,5-dimethyl- and 1,3,5,7-tetramethyl-meso-pentafluorophenyl BODIPY dyes", *Journal of Porphyrins and Phthalocyanines*, 2022, 26, 691–700. <https://doi.org/10.1142/S1088424622500535>

Contribution: designed the compound series and led synthesis, SAR, and analytical characterisation.

B. Musikavanhu, S. Muthusamy, D. Zhu, Z. Xue, Q. Yu, C. N. Chiyumba, J. Mack, T. Nyokong, S. Wang and L. Zhao, "A simple quinoline-thiophene Schiff base turn-off chemosensor for Hg²⁺ detection: spectroscopy, sensing properties and applications", *Spectrochimica Acta Part A: Molecular and Biomolecular Spectroscopy*, 2022, 264, 120338. <https://doi.org/10.1016/j.saa.2021.120338>

CONFERENCES & FUNDING

- **BioTrans 2025, Basel, Switzerland** — poster presentation.
- **Canada-UK Joint Symposium on Inorganic Chemistry, Quebec, Canada (2025)** — poster presentation, supported by an RSC Travel Grant (£500).
- **16th Pan Africa Chemistry Network Congress, Nairobi, Kenya (2024)** — 10-minute oral presentation, supported by an RSC Pan Africa Chemistry Network Congress Fund (£2,000).

ADDITIONAL EXPERIENCE

Demonstrator / Supervisor, University of Cambridge, Oct 2022 – Present

- Trained 20+ undergraduate students in lab technique, risk assessment, and experimental troubleshooting; ran weekly problem-solving sessions for 6 students across organic and physical chemistry.

Non-Executive Board Member, Cambridge-Africa ALBORADA Research Fund, Jul 2023 – Present

- Reviewed 10+ research grant proposals annually and advised the executive board on strategic funding priorities.