

Dr. Graham Chakafana

Assistant Professor, Department of Chemistry and Biochemistry

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Expertise: Protein Structure and Function, Drug Discovery

Education

- Postdoctoral Fellowship, Medicine, Stanford University, 2022
 - Postdoctoral Fellowship, Medicine, University of Cape Town, 2021
 - Ph.D. Protein Biochemistry, University of Venda, 2020
 - M.Sc. Microbiology (Distinction), National University of Science and Technology, 2015
 - B.Sc. (Hons) Biotechnology, Chinhoyi University of Technology, 2011
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Courses Taught

- Advanced Biochemistry
 - Biophysical Chemistry
 - Elementary Biochemistry
 - Research Topics in Chemistry
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Research Interests and Expertise

Dr. Graham Chakafana's research explores the proteomic foundations of infectious and cardiovascular diseases with the goal of identifying therapeutic targets that advance treatment options.

Infectious Diseases: Dr. Chakafana's lab investigates the structural and functional properties of druggable proteins across a range of infectious diseases including *Plasmodium sp* that are responsible for malaria. His lab utilizes biophysical and biochemical methods to characterize putative druggable proteins from infectious agents. By targeting essential proteins in pathogens, his research seeks to disrupt critical pathways necessary for their survival, offering potential for selective therapeutic interventions that minimize harm to human cells.

Cardiovascular Disease: In his cardiovascular research, Dr. Chakafana focuses on the proteomic and genetic determinants of hypertensive heart disease and Chagas disease, particularly within minority populations, to better understand the molecular drivers of these conditions and identify effective interventions.

Links to My Research

[Google Scholar Profile](#)

Selected Publications

1. **Structural and Functional Analyses of *Trypanosoma brucei* Nucleoside Diphosphate Kinase: A Potential Target for Antitrypanosomal Drug Development.** *ACS Omega*. 2025. P. Makori, N. Poolsawat, F. Payne, M. Gatling, C. Greer, D. Hayes, A. Jefferson, M. Maxwell, C. Smith, J. Watson, L. Williams, J. Barkley, C. Pepper, T. Zininga, O. Poore, L. Zuma, S. Subramanian, P. J Myler, O Asojo, G. Chakafana* [Submitted]
2. **Advances in Biomarker Discovery for Peripartum Cardiomyopathy: Current Status and Future Directions.** *Current Heart Failure Reports*. 2025. E. Pretorius, S. Annareddy, A. Barnet, V. Kodogo, K. Sliwa, G. Chakafana, T. Zininga, [Under Review]
3. **The biochemistry of heat shock proteins from human intracellular protozoan parasites as diagnostic and therapeutic biomarkers.** *Biochemistry*. 2025. G. Chakafana, Zininga, T
4. **Ternary structure of *Plasmodium vivax* N-myristoyl transferase (PvNMT) with myristoyl-CoA and inhibitor IMP-0001173.** *Acta Crystallographica F*. 2024. C. Bolling, A. Mendez, S. Taylor, S. Makumire, A. Reers, R. Zigweid, S. Subramanian, D. M. Dranow, B. Staker, T. E. Edwards, E W. Tate, A. S. Bellg, P. J. Myler, O. A. Asojo, and G. Chakafana*
5. **Proteome profiling in patients with peripartum cardiomyopathy according to ethnicity a biomarker study on the EORP cohort.** *European Heart Journal*. 2024. Kodogo, V., Viljoen, C., Chakafana, G., Hoevelmann, J., Jackson, A., Al-Farhan, H., Goland, S., Tromp, J., Van Der Meer, P., Karaye, K. and Kryczka, K
6. **Structure of *Plasmodium vivax* N-myristoyl transferase with inhibitor IMP-1088 - exploring an NMT inhibitor for antimalarial therapy.** *ACTA Cryst.* 2024. A. Mendez, C. Bolling, S. Taylor, S. Makumire, A. Reers, R. Zigweid, S. Subramanian, D.M. Dranow, B. Staker, T.E. Edwards, E.W.Tate, A.S. Bell, P.J. Myler, O.A. Asojo and G. Chakafana*
8. **Structures of *Brucella ovis* leucine-, isoleucine-, valine-, threonine- and alanine-binding protein reveal a conformationally flexible peptide-binding cavity.** *Acta Crystallographica F*. 2024. G. Chakafana*, R. Boswell, A. Chandler, K. A. Jackson, S. Neblett, T. Postal, S. Subramanian, J. Abendroth, P J. Myler and O A. Asojo*
*(student mentees shown in blue)
9. **Swapping the linkers of canonical Hsp70 and Hsp110 chaperones compromises both self-association and client selection.** *Heliyon*. 2024 Chakafana, G., Middlemiss, C.J., Zininga, T. and Shonhai, A
10. **Insertion of GGMP repeat residues of *Plasmodium falciparum* Hsp70-1 in the lid of DnaK adversely impacts client recognition.** *International Journal of Biological Macromolecules*, 255. 2024. Dongola, T.H., Chakafana, G., Middlemiss, C., Mafethe, O., Mokoena, F., Zininga, T. and Shonhai, A

Book Chapters

1. **Immunotherapy and targeted therapy in head and neck cancer.** In *Navigating Head and Neck Cancer: Advances in Diagnosis and Treatment* (p. 139). Oxford University Press. 2025. Damane, B. P., Maebele, L. T., Maphoso, T., Mulaudzi, T. V., Holst, F., Chakafana, G., & Dlamini, Z
2. **Functionalized nanobody-based delivery systems for cancer diagnosis and therapeutic applications.** 2023. G V. Kumar, A. Manicum, T. Makwikwi, G. Chakafana, E. Agwamba, D. R. Katerere.

Professional Honors and Awards

- Princeton University, Visiting Faculty Research Partnership, 2023, 2024
 - National Crystallization Center Meritorious User Award, 2023
 - UCT Faculty of Health Sciences Best Publication Award, 2021
 - NUST University Book Prize (Best MSc Student, Biochemistry), 2015
 - Vice Chancellor's Award (Best MSc Student, Applied Microbiology), 2015
 - ZOE Manufacturer's Prize (Best MSc Student, Faculty of Science), 2015
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Professional Affiliations

- American Society for Biochemistry and Molecular Biology (ASBMB)
 - American Heart Association (AHA)
 - Virginia Academy of Science
 - American Chemical Society
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Editorial Board Positions

- Associate Editor, *Frontiers in Molecular Biosciences*
- Associate Editor, *Acta Crystallographica*