

# Chidozie (Williams) Chukwu

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## Curriculum Vitæ

### Research Interests

- Mathematical Biology, Multiscale Modeling, Partial Differential Equations, Machine Learning/AI for Health, Data Analysis, Computational Mathematics and Optimal Control Theory.

### Education

- Jan 2019 - Oct 2021 **PhD, Applied Mathematics, Department of Mathematics and Applied Mathematics, University of Johannesburg (UJ)**, Johannesburg, South Africa
- Jan 2016 - Dec 2018 **Master of Science, Applied Mathematics, Department of Mathematics and Applied Mathematics, University of Johannesburg**, Johannesburg, South Africa
- Jan 2011 - Dec 2015 **BSc, Mathematics and Applied Mathematics, Department of Mathematical Science, University of South Africa (UNISA)**, Johannesburg, South Africa

### Experience

- Current **Professional Lecturer, DePaul University (DPU)**, Chicago, Illinois, USA
- Aug. 15, 2022-Aug. 15, 2024 **Visiting Assistant Professor of Mathematics, Wake Forest University (WFU)**, North Carolina, USA
- Jan. 12 - Aug 14 2022 **Postdoctoral Research Scholar, University of California San Diego (UCSD)**, California, USA
- Jun. 15 - Dec. 15 2021 **Postdoctoral Fellow, Universitas Airlangga**, Surabaya, Indonesia
- Jan. 7, 2019 - Dec. 7, 2021 **Lecturer, University of Johannesburg**, Johannesburg, South Africa
- Jun. 2016 - Dec. 2021 **Independent Contractor, University of South Africa**, Johannesburg, South Africa
- Feb. 2015 - Nov. 2018 **Teaching Assistant, University of Johannesburg**, Johannesburg, South Africa

### Teaching Experience

#### Courses Taught at University Level

- Discrete Mathematics (MAT 140)-DPU AQ2024
- Quantitative Reasoning (MAT 120)-DPU AQ2024
- Calculus with Analytical Geometry 1 (MTH111)-WFU Summer 11, 2024
- Linear Algebra (MTH121)-WFU Summer 1, 2024
- Calculus with Analytical Geometry 1 (MTH111)-WFU Spring, Summer 11, Fall 2023
- Ordinary Differential Equation (MTH251)-WFU Spring 2024
- Individual Study (MTH381)-WFU Spring 2024
- Calculus with Analytical Geometry 1 (MTH111)-WFU Spring, Summer, Fall 2023
- Calculus with Analytical Geometry 1 (MTH111)-WFU Fall 2022
- Problem-Solving Seminar (MTH165)-WFU Fall 2022
- Mathematics for Teachers (MAFT03A&MAF03B)-UJ Semester 1&2 2021
- Basic Math. and Apl. in Econ./Bus (MAEB0A1&MAEB0B1)-UJ Semester 1&2 2019-2021
- Calculus of one Variable (MAT1EA1)-UJ Semester 1 2018
- Calculus B (MAT1613)-UNISA Semester 1&2 2019
- Calculus A (MAT1512)-UNISA Semester 1&2 2019

○ Multivariable Calculus (MAT2615)-UNISA	Semester 1&2 2016
○ Engineering Mathematics (EMT4801)-UNISA	Semester 1&2 2014 - 2018
○ Linear Algebra 1 & 2 (MAT1503&MAT2611)-UNISA	Semester 1&2 2012 - 2018
○ Numerical Analysis (APM2A&APM2B)-UJ	Jun. 2015 - 2018

## Computing Proficiency

**OS:** Mac OS X, Linux ([Ubuntu](#), [Debian](#)), Windows.      **Scientific:** [Python](#), [MATLAB](#), [MATHEMATICA](#), [Maple](#), [SAGE](#)

**Programming:**

**Typography:** [L<sup>A</sup>T<sub>E</sub>X](#), [Endnote](#)

**Educational software's:** [Canvas](#), [Webassign](#), [Blackboard collaborate](#)

## Invited Talks

- Nov. 15, 2023 **Winston-Salem State University, Mathematics and Statistics Club, NC, USA,**  
Colloquium Title: The interplay of Mathematics and biology in predicting the control of disease spread
- May 31 - Jun. 4, 2023 **The 13th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Wilmington, NC USA,**  
Invited Talk Title: Analysis of two-group Malaria model incorporating vaccination and optimal control
- Apr. 19, 2023 **Mathbio Seminar Virginia Tech, Virginia Tech University, USA,**  
Invited Title: Modeling key factors contributing to malaria transmission: A case study Indonesia
- Oct. 3, 2022 **Keynote Speaker: Virtual International Research Outreach Programme (IROP-2022)** , *Dong Thap University, Vietnam, Talk title: A simulation study of HIV/AIDS-Listeriosis co-dynamics in the human population*

## Conference/Workshop Attended

- May. 20 – 24, 2024 **The CBMS Conference: Mathematical Methods for Novel Metamaterials,** *Auburn University, USA*
- May. 15 – 17, 2024 **Biology and Medicine Through Mathematics Conference,** *Predicting the Pandemic: Unmasking the Numbers Behind Social Distancing in South Africa's COVID-19 Response, Virginia Commonwealth University, USA*
- Mar. 14 – 16, 2024 **103rd Annual Meeting of the Southeast Section of the Mathematical Association of America,** *Predicting the Pandemic: Unmasking the Numbers Behind Social Distancing in South Africa's COVID-19 Response, University of Tennessee, USA*
- Jan. 3 - 6, 2024 **2024 Joint Mathematics Meetings (JMM 2024) - AMS Special Session on Dynamics and Management in Disease,** *Can key factors contributing to Malaria transmission be controlled? a case study West Sumba Indonesia, San Francisco, USA*
- Mar. 22 - 24, 2023 **Non-compartmental Analysis: Bioequivalence & Beyond Spring School with PKanalix virtual course (by Lixoft),** *Online*
- Mar. 14 - 18, 2023 **Pharmacometrics Spring School: Modeling & Simulation Using MonolixSuite virtual course (by Lixoft),** *Online*
- June 12 – 16, 2023 **Mathematical and Computational Biology workshop at the Institute for Computational and Experimental Research in Mathematics (ICERM)/Brown University, Providence, Rhode Island, USA,**  
Poster Title: A Lesson learned from modeling Listeriosis of RTE food products
- Mar. 17 - 19, 2023 **2023 Shanks Workshop on Advances in Mathematical and Theoretical Biology, Vanderbilt University, USA ,**  
Talk Title: On modeling malaria dynamics with seasonal factor
- Feb. 26 - 28, 2023 **SMB EPI-PDEE Virtual Mini-conference (Joint meeting between the Mathematical Epidemiology and Population Dynamics, Ecology, & Evolution Subgroups),**  
*Online*
- Jan 31 and Feb 7, 2023 **Multiple Virtual Colloquium on Mathematics for Public Health Organized by The Fields Institute Canada,** *Online*
- Nov. 28–Dec. 3, 2022 **The 6th Black in AI Workshop, co-located with Neural Information Processing Systems (NeurIPS) 2022, New Orleans, USA,**  
Poster title: On the modeling of Schistosomiasis transmission with intermediate host
- Nov. 12–13, 2022 **40th Southeastern-Atlantic Regional Conference on Differential Equations, North Carolina State University, Raleigh, USA,**  
Talk title: On the impact of super spreaders on COVID-19 dynamics

- Nov. 17, 2022 **American Women in Mathematics (AWM) lightning research talks**, Wake Forest University, Winston-Salem, USA, *Talk title: mathematical modeling and optimal control of infectious diseases*
- Nov. 10, 2022 **Wake Forest University Applied Maths Weekly seminar**, Wake Forest University, Winston-Salem, USA, *Talk title: On the impact of optimal control strategies to curtail the spread of COVID-19: a case study South Africa*
- Oct. 28–30, 2022 **8th International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems (ICMA-VIII)**, University of Louisiana, Lafayette, Louisiana, USA,  
Poster presentation: Assessing the impact of co-dynamics Listeriosis-Meningitis in human population
- 5 - 6 Oct 2021 **The Black Heroes of Mathematics Conference 2021**, Online conference, Durban, South Africa
- 25–26 Aug 2021 **The 8th International Conference on Basic and Applied Sciences (ICOWOBAS)**, University of Airlangga, Surabaya, Indonesia
- 16 - 17 Jul 2021 **The International Symposium on Biomathematics (SYMOMATH)**, University of Airlangga, Online,  
*Talk title: Modelling Listeriosis disease driven by cross-contamination of ready-to-eat food products*
- Nov. 19-22, 2020 and 2021 **60th Annual Congress of the South African Mathematical Society (SAMS2020/21)**, Online, Potchefstroom, South Africa

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## Awards

- Jul. 2024 **AMS-Simon Travel Grant**, AMS, USA,
- Jan. 2015 - Dec. 2021 **Postgraduate**, University of Johannesburg, Johannesburg, South Africa
- URC PhD International Scholarship
  - Global Excellency Scholarship Statute (GES)
  - UJ Faculty of Science top-up and Merit Bursary
  - National Research Fund South Africa (NRF) Scarce Skills Scholarship
- Aug. 2021 **Symomath 2021**, Conference publication Grant Awardee

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## Travel Grant/Funding

- WFU Provost funding, 2000:00 USD Mar. 27, 2024
- ICERM, 1040:00 USD May 10, 2023
- WFU Faculty Development Funding, 1000:00 USD May 17, 2023
- Shanks Workshop grant 1000:00 USD Mar. 2023
- Black in AI conference, 1200:00 USD Nov. 2022
- 40<sup>th</sup> SAERDCE grant 560:00 USD Nov. 2022
- 2022 CBMS Conference, 1100:00 USD May 2022

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## Professional Affiliations

- American Mathematical Society (AMS)
- Society for Mathematical Biology (SMB)
- International Society of Difference Equations (ISDE)
- Models of Infectious Disease Agent Study (MIDAS)
- Southern Africa Mathematical Sciences Association (SAMSA)
- Golden Key International Honour Society (GKIHS)- Lifetime membership

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## Service

- Oct. 19, 2023 **Project Pumpkin Plunge Event**, Organized by Wake Forest University, NC, USA  
Project Pumpkin is a Halloween-themed festival for community members including trick-or-treating, carnival games, entertainment, and educational activities
- Oct. 2 - Dec. 8, 2023 **Virtual Tutoring Program for Winston-Salem Forsyth County Schools**, Organized by Wake Forest University, NC, USA
- Feb. 2023/2024 **MathCount**, Wake Forest University, NC, USA
- May. 2022 **Chairing a CBMS conference session**, University of Central Florida, FL, USA
- Feb. 2016 - Dec. 2020 **Soweto Science Campus**, University of Johannesburg, JHB, South Africa

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## Editorial Board Member

- Jan. 2024 - **Special Issue Editor**, *Special on Mathematical Biology and Its Applications to Disease Modeling*  
Current [Mathematics MDPI](#)
- Aug. 2022 - **Associate Editor**, *Unnes Journal of Mathematics*  
Current
- May 2023 - **Reviewer**, *Mathematical Reviews/MathSciNet (AMS)*  
Current

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## Selected Journal Review Work

- PLoS One
- Nonlinear Dynamics
- Scientific Reports
- Mathematical Bioscience and Engineering
- Journal of Theoretical Biology (JTB)
- Alexandria Engineering Journal (AEJ)
- Results in Physics Elsevier Journal
- International Journal of Biomathematics (IJB)
- Mathematics and Computers in Simulation Elsevier (MATCOM)
- International Journal of Applied and Computational Mathematics (IACM)
- Computational and Applied Mathematics (COAM) Springer Nature
- International Journal of Modelling and Simulation (Taylor and Francis)

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## Advising Experience

**Duncan Saningo Kishoyian**, *African Institute for Mathematical Sciences (AIMS) Ghana*

Co-supervised M.Sc project: A Mathematical Model and Analysis of Impact of Public Health Campaigns on Alcoholism Dynamics Jun. 2023

**Joel-Pascal Ntwali N’Konzi**, *African Institute for Mathematical Sciences (AIMS) South Africa*

Co-supervised M.Sc project: Modeling the Role of Fear on COVID-19 Infection Dynamic (*Cum laude*) Nov. 2022

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## Undergraduate Research

**Luke MacPhee**, *Wake Forest University*

Undergraduate project: Modeling Within Host Dynamics of Listeriosis in the Human Population Spring 2024

**Kate Bucci**, *Wake Forest University*

Undergraduate project: Times Series Forecasting of Measles Yearly Cases: Prediction and Analysis for Niger Spring 2024

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## Publications

- 20 [Chukwu C.W.](#), Chazuka Z., Safdar S., Alida D., Assessing Syphilis transmission among MSM population incorporating low and high-risk infection: a modeling study. *Comp. Appl. Math.* 43, 205 (2024). <https://doi.org/10.1007/s40314-024-02669-8>.
- 19 Dipo Aldila, Basyar Lauzha Fardiana, [Chukwu C.W.](#), Muhamad Hifzhudin Noor Aziz, Putri Zahra Kamalia, Improving tuberculosis control: assessing the value of medical masks and case detection—a multi-country study with cost-effectiveness analysis, *R. Soc. Open Sci.*11231715, <http://doi.org/10.1098/rsos.231715>
- 18 Chazuka Z., [Chukwu C.W.](#), and Moremedi G. M., On modelling the in-host dynamics of HIV/HPV co-infection in the human population, *Commun. Math. Biol. Neurosci.*, 2023 (2023), Article ID 79
- 17 Aldila D., Awdinda N., Farrel H., F. Fatmawati and [Chukwu C.W.](#), Optimal control of pneumonia transmission model with seasonal factor: Learning from Jakarta incidence data, *Heliyon*, (2023), <https://doi.org/10.1016/j.heliyon.2023.e18096>
- 16 Fatmawati, [Chukwu C.W.](#), Alqahtani R. T., Alfiniyah C., Herdicho F.F., Tasmi, A Pontryagin’s maximum principle and optimal control model with cost-effectiveness analysis of the COVID-19 epidemic, *Decision Analytics*, 2023, 100273, <https://doi.org/10.1016/j.dajour.2023.100273>
- 15 Gao S., Pant B., [Chukwu C.W.](#), Kwofie T., Newman L., Choe S., Laurie Balstad, Safdar S., Attipoe W., Li J., K.D. Bimal, Li Y., Z. Wenjing and van den Driessche P., A mathematical model to assess the impact of testing and isolation compliance on the transmission of COVID-19, *Infectious Disease Modelling*, 2023, <https://doi.org/10.1016/j.idm.2023.04.005>

- 14 [Chukwu C.W.](#), Nyabadza F., and Asamoah J.K.K., A mathematical model and optimal control of Listeriosis from ready-to-eat food products, *Int. J. Computing Science and Mathematics*, Vol. 17, No. 1, 2023, DOI: [10.1504/IJCSM.2023.10055620](https://doi.org/10.1504/IJCSM.2023.10055620)
- 13 Rois M.A., Fatmawati F., Alfiniyah C. and [Chukwu C.W.](#), Dynamic analysis and optimal control of COVID-19 with comorbidity: A modeling study of Indonesia, *Frontiers in Applied Mathematics and Statistics*, 8, p.130, 2023, doi:[10.3389/fams.2022.1096141](https://doi.org/10.3389/fams.2022.1096141)
- 12 [Chukwu C.W.](#) and Nyabadza F., A theoretical model of Listeriosis driven by cross-contamination of ready-to-eat food products, *International Journal of Mathematics and Mathematical Sciences*, 2020, Article ID 9207403, 14 pages, (2020), <https://doi.org/10.1155/2020/9207403>
- 11 A. Dipo, P. A. Dumbela, H. Tasman, M. Z. Ndi, Fatmawati and [Chukwu C.W.](#), Assessing the impact of relapse, reinfection and recrudescence on malaria eradication policy: A bifurcation and optimal control analysis, *Trop. Med. Infect. Dis.* 2022, 7, 263, <https://doi.org/10.3390/tropicalmed7100263>
- 10 [Chukwu C.W.](#), Juga M. L. Chazuka Z. and Mushayu J., Mathematical analysis and sensitivity assessment of HIV/AIDS-Listeriosis co-infection dynamics, *Int. J. Appl. Comput. Math* 8, 251 (2022), <https://doi.org/10.1007/s40819-022-01458-3>
- 9 B.D. Handari, R.A. Ramadhani, [Chukwu C.W. et al.](#), An optimal control model to understand the potential impact of the new vaccine and transmission-blocking drugs for malaria: A case study in Papua and West Papua, Indonesia, *Vaccines* 2022, 10, 1174, <https://doi.org/10.3390/vaccines10081174>
- 8 C.J. Edholm, B. Levy, L. Spence, F.B. Agosto, F. Chirove, [Chukwu C.W.](#), D. Goldsman, M. Kgosimore, I. Maposa, K.A. Jane White and S. Lenhart, A vaccination model for COVID-19 in Gauteng, South Africa, *Infectious Disease Modelling*, 2022, <https://doi.org/10.1016/j.idm.2022.06.00>
- 7 Gatyeni P., [Chukwu C.W.](#), Chirove F., Fatimawati and Nyabadza F., Application of optimal to long term dynamics of Covid-19 disease in South Africa, *Scientific African*, p.e01268, <https://doi.org/10.1016/j.sciaf.2022.e01268>
- 6 Mushanyu J., [Chukwu C.W.](#), Nyabadza F. and Muchatibaya G., Modelling the potential role of super spreaders on COVID-19 transmission dynamics, *Int. J. Math. Model. Numer. Optim.* 12(2), pp.191-209,2022, <https://doi.org/10.1504/IJMMNO.2022.122123>
- 5 [Chukwu C.W.](#), Nyabadza F. and Fatimawati, Modeling the potential role of media campaigns on the control of Listeriosis, *Mathematics Bioscience Engineering*, 2021, 18(6): 7580-7601, <https://doi.org/10.3934/mbe.2021375>
- 4 Tasman H., Herdicho F. F. and [Chukwu C.W.](#), Optimal control problem of Malaria model with seasonality effect using real data, Fatimawati, *Communications in Mathematical Biology and Neuroscience* 2021, (2021), 66, <https://doi.org/10.28919/cmbn/6059>
- 3 Fatimawati, Herdicho F., Windarto F., [Chukwu C.W.](#) and Tasman H., An optimal control of Malaria transmission model with mosquito seasonal factor, *Results in Physics*, (2021), p.104238, <https://doi.org/10.1016/j.rinp.2021.104238>
- 2 [Chukwu C.W.](#), Mushayua J., Juga M. L. and Fatimawati, A mathematical model and of codynamics of Listeriosis and meningitis diseases, *Communications in Mathematical Biology and Neuroscience*, 2020 (2020), Article ID 83, <https://doi.org/10.28919/cmbn/5060>
- 1 Nyabadza F., Chirove F., [Chukwu C.W.](#) and Visaya M.V., Modelling the potential impact of social distancing on the COVID-19 epidemic in South Africa, *Computational and Mathematical Methods in Medicine*, vol. 2020, Article ID 5379278, 12 pages, 2020, <https://doi.org/10.1155/2020/5379278>

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## Referees

*Available on request.*