

(A): Peer-reviewed Publications

165. Salman Safdar, Calistus N. Ngonghala and Abba B. Gumel. Mathematical assessment of the role of waning and boosting immunity against the BA.1 Omicron variant in the United States. *Mathematical Biosciences and Engineering*. In press.
164. Calistus N. Ngonghala, Hemaho B. Taboe, Salman Safdar and Abba B. Gumel. Unraveling the dynamics of Omicron and Delta variants of the 2019 coronavirus in the presence of vaccination, mask usage and antiviral treatment. *Applied Mathematical Modeling*. In press.
163. SJ Brozak, J Mohammed-Awel and AB Gumel. Mathematics of a single-locus model for assessing the impacts of pyrethroid resistance and temperature on population abundance of malaria mosquitoes. *Infectious Disease Modeling*, 7(3)(2022): 277-316.
162. Elamin H. Elbasha and Abba B. Gumel. Vaccination and herd immunity thresholds in heterogeneous populations. *Journal of Mathematical Biology*. 83, 73 (2021). <https://doi.org/10.1007/s00285-021-01686-z>
161. Samantha J. Brozak, Binod Pant, Salman Safdar and Abba B. Gumel. Dynamics of COVID-19 pandemic in India and Pakistan: A metapopulation modelling approach. *Infectious Disease Modeling*. 6(2021): 1173e1201
160. Marina Mancuso, Steffen Eikenberry and Abba B. Gumel. Will Vaccine-derived Protective Immunity Curtail COVID-19 Variants in the US? *Infectious Disease Modelling*. 6(2021): 1110-1134.
159. Calistus N. Ngonghala, James R. Knitter, Lucas Marinacci, Matthew H. Bonds and Abba B. Gumel. Assessing the impact of widespread respirator use in curtailing COVID-19 transmission in the United States. *Royal Society Open Science*. 8(2021): 210699. <https://doi.org/10.1098/rsos.210699>
158. Abba B. Gumel, Enahoro A. Iboi, Calistus N. Ngonghala and Elamin H. Elbasha. A primer on using mathematics to understand COVID-19 dynamics: Modeling, analysis and simulations. *Infectious Disease Modeling*. 6(2021): 1-21.
157. Tufail M. Malik, Jemal Mohammed-Awel, Abba B. Gumel and Elamin H. Elbasha. Mathematical assessment of the impact of cohort vaccination on pneumococcal carriage and serotype replacement. *Journal of Biological Dynamics*. Vol. 15, No S1, S214-S247, 2021. DOI: <https://doi.org/10.1080/17513758.2021.1884760>.
156. Abba B. Gumel, Enahoro Iboi, Calistus Ngonghala and Gideon Ngwa. Towards achieving a vaccine-derived herd immunity threshold for COVID-19 in the U.S. *Frontiers in Public Health*. 9:709369. doi: 10.3389/fpubh.2021.709369.
155. Enahoro A. Iboi, Oluwaseun Sharomi, Calistus N. Ngonghala and Abba B. Gumel. Mathematical modeling and analysis of COVID-19 pandemic in Nigeria. *Mathematical Biosciences and Engineering*. 17(6)(2020): 7192-7220.
154. Calistus N. Ngonghala, Enahoro Iboi and Abba B. Gumel. Could masks curtail the post-lockdown resurgence of COVID-19 in the US? *Mathematical Biosciences*. 329(2020), 108452. **This paper is listed among the most-downloaded for the journal.**
153. Enahoro Iboi, Calistus N. Ngonghala and Abba B. Gumel. Will an imperfect vaccine curtail the COVID-19 pandemic in the US? *Infectious Disease Modeling*. 5(2020): 510-524.

152. Rahim Taghikhani, Oluwaseun Sharomi and Abba B. Gumel. Dynamics of a two-sex model for the population ecology of dengue mosquitoes in the presence of *Wolbachia*. *Mathematical Biosciences*. 328(2020): 108426
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149. Iboi Enahoro, Abba Gumel and Jesse E. Taylor. Mathematical modeling of the impact of periodic release of sterile male mosquitoes and seasonality on the population abundance of malaria mosquitoes. *Journal of Biological Systems*. 28(2) (2020): 277-310.
148. Calistus Ngonghala, Enahoro Iboi, Steffen Eikenberry, Matthew Scotch, Chandini Raina MacIntyre, Matthew H. Bonds and Abba B. Gumel. Mathematical assessment of the impact of non-pharmaceutical interventions on curtailing the 2019 novel Coronavirus. *Mathematical Biosciences*. 325(2020): 108364. **This paper is listed among the most-downloaded for the journal.**
147. Steffen E. Eikenberry, Marina Mancuso, Enahoro Iboi, Tin Phan, Keenan Eikenberry, Yang Kuang, Eric Kostelich and Abba B. Gumel. To mask or not to mask: Modeling the potential for face mask use by the general public to curtail the COVID-19 pandemic. *Infectious Disease Modeling*. 5(2020) 293-308. **This paper won the best paper award for the journal.**
146. Antonella Lupica, Abba B. Gumel and Annunziata Palumbo. Type reproduction numbers and the environment-host-environment cholera transmission dynamics. *Journal of Biological Systems*. 28(2)(2020): 183-231.
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45. C. Bowman, A.B. Gumel, P. van den Driessche, J. Wu and H. Zhu. A mathematical model for assessing control strategies against West Nile virus. *Bulletin of Mathematical Biology.* 67(2005): 1107-1133. **(This paper was among the Top 25 Hottest Articles for July to September 2005)**(<http://top25.sciencedirect.com/subject/agricultural-and-biological-sciences/1/journal/bulletin-of-mathematical-biology/00928240/archive/5>). **This article has also been selected by Thomson Reuters Essential Science Indicators as one of the most cited papers in its research area (paper to also be highlighted on the websites of the Society of Mathematical Biology and the journal's).**

44. A.B. Gumel, K. Patidar and R.J. Spiteri. Asymptotically Consistent Non-Standard Finite-Difference Methods for Solving Mathematical Models Arising in Population Biology. Book Chapter. *Advances in the Applications of Nonstandard Finite Difference Schemes*. World Scientific, pp. 385-421, 2005 (Ronald Mickens, ed.)
43. A.B. Gumel and S.M. Moghadas. HIV control in vivo: Dynamical Analysis. *Communications in Non-linear Science and Numerical Simulations*. 9(2004): 561-568. (**This paper was listed among Top25 Hottest Articles for July-September, 2004**)(<http://top25.sciencedirect.com/subject/physics-and-astronomy/21/journal/communications-in-nonlinear-science-10075704/archive/1>).
42. A.B. Gumel, S. Ruan, T. Day, J. Watmough, F. Brauer, P. Driesche, D. Gabrielson, C. Bowman, M.E. Alexander, S. Ardal, J. Wu and B.M. Sahai. Modelling strategies for controlling SARS outbreaks. *Proceedings of the Royal Society, Series B*. 271(2004): 2223-2232.
41. M.E. Alexander, C. Bowman, A.B. Gumel, S.M. Moghadas, B.M. Sahai and R. Summers. A vaccination model for transmission dynamics of influenza. *SIAM Journal on Applied Dynamical Systems*. 3(4)(2004): 503-524. **This paper is among the most-downloaded articles for September 2006** ([http://epubs.siam.org/siads/most\\$\"\\$downloaded?month=9\\$\"&\\$year\\$=2006](http://epubs.siam.org/siads/most$\)).
40. A.B. Gumel, S.M. Moghadas and R.E. Mickens. Effect of a preventive vaccine on the dynamics of HIV transmission. *Communications in Non-linear Science and Numerical Simulations*. 9(6)(2004): 649-659.
39. S.M. Moghadas, A.B. Gumel, R.G. McLeod and R. Gordon. Could condoms stop the AIDS epidemic? *Journal of Theoretical Medicine*. 5(3-4)(2003): 171-181.
38. C. Zhen, A.B. Gumel and R.E. Mickens. Nonstandard discretizations of the generalized Nagumo reaction-diffusion equation. *Numerical Methods for Partial Differential Equations*. 19(3)(2003): 363-379.
37. A.B. Gumel, S.M. Moghadas, Y. Yuan and P. Yu. Bifurcation and stability analyses of a 13-D SEIC model using normal form reduction and numerical simulations. *Dynamics of Continuous, Discrete and Impulsive Systems, Series B*. 10(2003): 317-330.
36. W. Piyawong, E.H. Twizell and A.B. Gumel. An unconditionally-convergent finite-difference scheme for the SIR model. *Applied Mathematics and Computation*. 146(2003): 611-625.
35. S.M. Moghadas and A.B. Gumel. Dynamical and numerical analyses of a generalized food-chain model. *Applied Mathematics and Computation*. 142(1)(2003): 35-49.
34. A.B. Gumel, R.E. Mickens and B.D. Corbett. A non-standard finite-difference scheme for a model of HIV transmission and control. *Journal of Computational Methods in Sciences and Engineering*. 3(1)(2003): 91-98.
33. S.M. Moghadas and A.B. Gumel. A population model for the dynamics between HIV and another pathogen. *Australian and New Zealand Industrial and Applied Mathematics Journal*. 45(2003): 181-193.
32. S.M. Moghadas and A.B. Gumel. A mathematical study of a model for childhood diseases with non-permanent immunity. *Journal of Computational and Applied Mathematics*. 157(2)(2003): 347-363.

31. S.M. Moghadas, M.E. Alexander, B.D. Corbett and A.B. Gumel. A positivity-preserving Mickens-type discretization of an epidemic model. *Journal of Difference Equations and Applications*. Special Edition for Mickens' 60th Birthday. 9(11)(2003): 1037-1051.
30. A.B. Gumel and S.M. Moghadas. A qualitative study of a vaccination model with non-linear incidence. *Applied Mathematics and Computation*. 143(2-3)(2003): 409-419.
29. B.D. Corbett, S.M. Moghadas and A.B. Gumel. Sub-threshold domain of bistable equilibria for a model of HIV epidemiology. *International Journal of Mathematics and Mathematical Sciences*. 2003(58)(2003): 3679-3698.
28. A.B. Gumel. Removal of contrived chaos in finite-difference methods. *International Journal of Computer Mathematics*. 79(9)(2002): 1033-1041.
27. A.B. Gumel. A competitive numerical method for a chemotherapy model of two HIV subtypes. *Applied Mathematics and Computation*. 131(2-3)(2002): 329-337.
26. S.M. Moghadas and A.B. Gumel. Analysis of a model for transmission dynamics of tuberculosis. *Canadian Applied Mathematics Quarterly*. 10(3) (2002): 411-428.
25. R.E. Mickens and A.B. Gumel. Numerical study of a nonstandard finite-difference scheme for the van der Pol equation. *Journal of Sound and Vibration*. 250(5)(2002): 955-963.
24. A.B. Gumel, Xuwu Zhang, P.N. Shivakumar, M.L. Garba and B.M. Sahai. A new mathematical model for assessing therapeutic strategies of HIV infection. *Journal of Theoretical Medicine*. 4(2)(2002): 147-155.
23. S.M. Moghadas and A.B. Gumel. Global stability of a two-stage epidemic model with generalized non-linear incidence. *Mathematics and Computers in Simulation*. 60(1-2)(2002): 107-118.
22. R.E. Mickens and A.B. Gumel. Construction and analysis of a nonstandard finite difference scheme for the Burgers-Fisher equation. *Journal of Sound and Vibration* 257 (4)(2002): 791-797.
21. A.B. Gumel. Numerical modelling of the transmission dynamics of drug-sensitive and drug-resistant HSV-2. *Communications in Non-linear Science and Numerical Simulation* 6(1)(2001): 23-27.
20. A.B. Gumel, P.N. Shivakumar and B.M. Sahai. A mathematical model for the dynamics of HIV-1 during the typical course of infection. *Non-linear Analysis: Theory, Methods and Applications*. 47(3)(2001): 1773-1783.
19. P. Yu and A.B. Gumel. Bifurcation and stability analyses for a coupled Brusselator model. *Journal of Sound and Vibration*. 244 (5)(2001): 795-820.
18. A.B. Gumel, T.D. Loewen, P.N. Shivakumar, B.M. Sahai, P. Yu and M.L. Garba. Numerical modelling of the perturbation of HIV-1 during combination anti-retroviral therapy. *Computers in Biology and Medicine*. 31(5)(2001): 287-301.
17. W.T. Ang and A.B. Gumel. A boundary integral method for the three-dimensional heat equation subject to specification of energy. *Journal of Computational and Applied Mathematics*. 135 (2)(2001): 303-311.

16. A.B. Gumel, E.H. Twizell and P. Yu. Numerical and bifurcation analyses of a population model of HIV chemotherapy. *Journal of Mathematics and Computers in Simulation*. 54, Iss.1-3 (2000): 169-181.
15. A.B. Gumel, W.F. Langford, E.H. Twizell and J. Wu. Numerical solutions for a coupled non-linear oscillator. *Journal of Mathematical Chemistry*. 28(4)(2000): 325-340.
14. A.B. Gumel. On the numerical solution of the diffusion equation subject to the specification of mass. *Journal of Australian Mathematics Society Series B* 40(4)(1999): 475-483.
13. A.B. Gumel, Q. Cao and E.H. Twizell. A second-order scheme for the Brusselator reaction-diffusion system. *Journal of Mathematical Chemistry*. 26(1999): 297-316.
12. A.B. Gumel and E.H. Twizell. Numerical analysis of defects caused by thermolysis in an infinite cylindrical ceramic moulding. *Pertanika Journal of Science and Technology*. 17(1)(1999): 13-24.
11. A.B. Gumel. Numerical solutions for the canonical escape equation. *South East Asian Bulletin of Mathematics* 22(1998): 373-380.
10. A.B. Gumel, K. Kubota and E.H. Twizell. A sequential algorithm for the non-linear dual-sorption model of percutaneous drug absorption. *Mathematical Biosciences* 152(1998): 87-103.
9. A.B. Gumel, E.H. Twizell and M.A. Arigu. L₀-stable parallel methods for multi-dimensional heat equation. *Parallel Algorithms and Applications* 11(1997): 13-25.
8. A.B. Gumel, E.H. Twizell, M.A. Arigu and F. Fakhr. Numerical methods for a non-linear system arising in chemical kinetics. *Pertanika Journal of Science and Technology* 5(2)(1997): 191-200.
7. A.B. Gumel, W.T. Ang and E.H. Twizell. Efficient parallel algorithm for the two-dimensional diffusion equation subject to the specification of mass. *International Journal of Computer Mathematics* 64 (1+2)(1997): 153-163.
6. W.T. Ang and A.B. Gumel. Multiple interacting planar cracks in an inisotropic multi-layered medium under an anti-plane shear stress: A hyper-singular integral approach. *Engineering Analysis with Boundary Elements* 2021(1996) 18(Iss.4): 297-303.
5. E.H. Twizell, A.B. Gumel and M.A. Arigu. Second-order, L₀-stable methods for partial differential equations with time-dependent boundary conditions. *Advances in Computational Mathematics* 6(3-4)(1996): 333-352.
4. M.A. Arigu, E.H. Twizell and A.B. Gumel. Sequential and parallel methods for solving first-order hyperbolic equations. *Communications in Numerical Methods in Engineering* 12(1996): 557-568.
3. A.B. Gumel, E.H. Twizell, K. Kubota and M.A. Arigu. Higher-order parallel methods for a model of percutaneous drug absorption. *Intern. J. Computer Math.* 56(1995): 123-133.
2. M.A. Arigu, E.H. Twizell and A.B. Gumel. Parallel algorithms for second-order hyperbolic equations. *Parallel Algorithms and Applications*, 5(1995): 119-128.
1. M.A. Arigu, E.H. Twizell and A.B. Gumel. Parallel algorithms for fourth-order parabolic equations. *Parallel Algorithms and Applications* 5(1995): 273-286.

(B): Other Publications (Edited Volumes and Book Chapters)

1. Calistus N. Ngonghala and Abba B. Gumel. Mathematical assessment of the role of vaccination against COVID-19 in the United States. Book Chapter, COVID-19 Book, Elsevier (Jorge Velasco-Hernandez and Esteban Hernandez-Vargas, eds.). To appear.
2. Steffen Eikenberry and Abba Gumel. Mathematics of Malaria and Climate Change. Book Chapter in Mathematics of Planet Earth: Protecting Our Planet, Learning from the Past, Safeguarding the Future. Springer International Publishing AG, pp. 67-89, 2019. Hans G. Kaper and Fred S. Roberts eds.
3. **Book (Edited volume)**. Mathematics of Continuous and Discrete Dynamical Systems. Contemporary Mathematics Series, American Mathematical Society. Volume 618 (310 Pages), 2014.
4. **Book (Edited volume)**: Abba B. Gumel and Suzanne Lenhart (Eds.). Modeling Paradigms and Analysis of Disease Transmission Models. DIMACS Series in Discrete Mathematics and Theoretical Computer Science. Volume 75. American Mathematical Society, 2010 (268 Pages).
5. **Book (Edited volume)**: A.B. Gumel (Chief Editor), Carlos-Castillo-Chavez (ed.), Ronald E. Mickens (ed.) and Dominic Clemence (ed.). Mathematical Studies on Human Disease Dynamics: Emerging Paradigms and Challenges. American Mathematical Society Contemporary Mathematics Series, Volume 410, 2006 (389 Pages).
6. **Book chapter**: A.B. Gumel, K. Patidar and R.J. Spiteri. Asymptotically Consistent Non-Standard FiniteDifference Methods for Solving Mathematical Models Arising in Population Biology. Book Chapter. Advances in the Applications of Nonstandard Finite Difference Schemes. World Scientific, pp. 385-421, 2005 (Ronald Mickens, ed.).
7. A.B. Gumel and James Watmough (Guest Editors) Special Issue of Mathematical Biosciences and Engineering associated with the Banff Workshops on Infectious Disease Modelling, 2003/2004. Volume 3, Number 3, 2006.
8. A.B. Gumel (Guest Editor) Special Issue of Journal of Difference Equations and Applications dedicated to the 60th birthday of Ronald E. Mickens. Vol. 9, nos. 11& 12, pp. 989-1128, 2003.
9. Troy Day, Alison Galvani, Claudio Struchiner and Abba Gumel (Editors). Special Issue of the journal Vaccine associated with the DIMACS Workshop on “Evolutionary Aspects of Vaccine Use”, DIMACS Centre, June 26-29, 2005. Volume 26 S3, 2008.
10. A.B. Gumel. **Book Review**: Mathematical approaches for emerging and re-emerging infectious diseases: an introduction. Eds. Carlos Castillo-Chavez, Sally Blower, Pauline van den Driessche, Denise Kirschner and Abdul Aziz Yakubu. Bulletin of Mathematical Biology. 65(2003): 547-549.

(C): Selected Scientific Presentations

2022

- Tutorial on Epidemics at the Bootcamp for the Graph Limits and Processes on Networks: From Epidemics to Misinformation, Simons Institute for the Theory of Computing, University of California, Berkeley, August 29, 2022.

- Mathematics of the dynamics and control of the COVID-19 pandemic. Plenary lecture, Pan African Congress of Mathematicians (PACOM 2022), Marien-Ngouabi University, Brazzaville, Republic of Congo, August 4, 2022.
- Mathematics of malariology: a genetic-epidemiology framework. Invited lecture, SIAM Conference on the Life Sciences, Pittsburgh, Pennsylvania, July 14, 2022.
- Introduction to mathematical epidemiology. Series of plenary lectures at CIMPA Summer Research School in Mathematical Biology/Epidemiology, University of Dhaka, Bangladesh, May 17-20, 2022.
- Mathematics of vaccination against the COVID-19 pandemic. Invited lecture, Joint Meetings of the American Mathematical Society, April 7, 2022 (online).
- Mathematics of COVID-19 pandemic and control. Invited plenary at 2022 Showcase on Data Driven Discovery (part of NSF RTG), University of Arizona, Tucson, Arizona, March 1, 2022.

2021

- Mathematics of malaria mosquitoes and disease. Invited lecture, Annual Conference of the Society of Mathematical Biology (online), June 17, 2021.
- Mathematics of the Dynamics and Control of the COVID-19 Pandemic. Invited seminar, National Research Experience for Undergraduate Program, Lawrence Technological University, Michigan, USA, June 9, 2021.
- Mathematics of the Dynamics and Control of the COVID-19 Pandemic. Plenary lecture, Encontro Nacional de Modelagem Matematica da Covid-19, Brazil, May 25, 2021.
- Mathematics of the Dynamics and Control of the COVID-19 Pandemic. Invited seminar, Rochester Institute of Technology, April 13, 2021.
- Mathematics of Infectious Diseases. AMS Einstein Public Lecture in Mathematics, March 21, 2021.
- Mathematics of the Dynamics and Control of the COVID-19 Pandemic. Plenary lecture, International E-Conference on Mathematics and its Applications, University of Dhaka, Bangladesh, April 11, 2021.
- Co-organizer, AMS Special Session on Advances in the Applications of Nonstandard Finite Difference Methods. AMS Joint Meetings, January 6-9, 2021.
- Mathematics of the Dynamics and Control of the COVID-19 Pandemic. Invited lecture at Current Events Bulletin, AMS Joint Meetings, January 8, 2021.
- To mask or not to mask: that's the question for the COVID-19 pandemic. Invited lecture, AMS Joint Meetings, January 9, 2021.

2020

- Research and Publications in Mathematical Sciences: Best Practices. Webinar for Nigerian Mathematical Society, October 24, 2020.

- Guest lecture delivered to graduate students of UC Berkeley and Stanford (enrolled in Epidemics course co-taught by Drs. Amin Saberi (Stanford) and Christian Borgs (Berkeley)), October 22, 2020.
- Tutorial on Mathematical Modeling and Analysis of Epidemics. MSRI workshop on “Mathematical Models for Prediction and Control of Epidemics”, August 12, 2020.
- Could face masks curtail the post-lockdown resurgence of COVID-19 in the US? Invited seminar: Ecology, Evolution and Conservation Biology Seminar Series, Oregon State University, Nov. 20, 2020.
- Co-organizer, MSRI (Virtual) Workshop on Mathematical Models for Prediction and Control of Epidemics. August 12-14, 2020.
- Group leader, ADJOINT Workshop on modeling COVID-19. MSRI, June 15-26, 2020.

2019

- Plenary lecture, Riverside Mathematics Workshop for Excellence and Diversity, University of California Riverside, Riverside, California, October 2019
- Keynote address, 5th Strathmore International Mathematics Conference, Strathmore University, Nairobi, Kenya, August 12-16, 2019
- Plenary lecture, Hands-on Research in Complex Systems School, International Centre for Theoretical Physics, Trieste, Italy, July-August, 2019
- Invited lecture, annual meeting of the Society for Mathematical Biology, Universite de Montreal, Montreal, Canada, July 21-26, 2019

2018

- Invited lecture, Winter Meeting of the Canadian Mathematical Society, Vancouver, Canada, December 10-12, 2018.
- Keynote address on “STEM as Driver of Knowledge-based Economy”, Annual Meeting of the Southern African Mathematical Sciences Association (SAMSA), Botswana International University of Science and Technology, Palapye, Botswana, November 19-22, 2018 (the President of Botswana, Dr. Mokgweetsi Eric Keabetswe Masisi, was in attendance during my keynote address).
- Invited lecture at 2018 Blackwell-Tapia Conference, ICERM, Brown University, Providence, Rhode Island, USA, November 8-10, 2018.
- Plenary lecture on “Mathematics of infectious diseases: past, present and future”. Research Trends in Mathematical Modeling and Analysis in Life Sciences, University of Pretoria, South Africa, October 4-6, 2018. I also gave a public lecture on “interdisciplinary curriculum development at the interface of mathematics, life sciences and computing”, October 8, 2018.
- Plenary lecture, Second Erice Conference on Mathematical and Computational Epidemiology of Infectious Diseases. E. Majorana School of Mathematics, Erice, Italy, September 1, 2018.
- Plenary lecture, DIMACS Workshop on Mathematics of Planet Earth, DIMACS, Rutgers University, July 24-26, 2018.

- Plenary lecture, NSF-CBMS Regional Conference Mathematical Biology: Modeling and Analysis. Howard University, Washington, DC, May 21-25, 2018.
- Invited lecture, Annual Meeting of the Society of Mathematical Biology, Sydney, Australia, May 20, 2018 (I co-organized a special session).
- Public lecture on “Towards building a culture of research excellence”. Baze University, Abuja, Nigeria, May 15, 2018.
- Plenary lecture, Nigerian Mathematical Society Annual Conference, Bayero University, Kano, Nigeria, May 9-11, 2018.
- Invited lecture, AMS Spring Western Sectional Conference, Portland State University, Portland, Oregon, USA, April 16-18, 2018.

2017

- Plenary lectures on various topics on modeling infectious diseases at the 2017 Summer Course on Modeling and Analysis of Infectious Disease, National Taiwan University, Taipei, Taiwan, July 10-20, 2017.
- Invited lecture on “ Effect of temperature on the dynamics of malaria vector and disease: a theoretical analysis ”, ICMA VI, University of Arizona, Tucson, Arizona, USA, October 2017.
- Invited lecture on “Modeling the effect of temperature on the dynamics of malaria vector”, AMS Sectional Meeting, University of Central Florida, USA, September 2017.
- Invited lecture on “Dynamically-consistent NSFD Methods for Population Biology Models”. AMS Joint Meetings, Atlanta, January 4-7, 2017. I also organized a special session on “Advances in Mathematics of Ecology, Epidemiology and Immunology of Infectious Diseases”.

2016

- Seminar on “mathematics of climate change and vector-borne diseases”, Instituto de Matemáticas, UNAM-Juriquilla, Queretaro, Mexico, December 9, 2016.
- Invited lecture on “backward bifurcations in epidemic models”, 11th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Orlando, Florida, USA, July 2016. I also co-organized a special session on Modeling the 2014 Ebola Outbreaks.
- Invited online seminar on “Mathematical Assessment of the Role of Climate Variables on Malaria Dynamics”. Mathematical Bioscience Institute, REU Online Seminar, July 27, 2016.
- Keynote presentation at a workshop on “Global Change Impact on Diseases and Alien Species Expansion”, African Institute of Mathematical Sciences, Muizenberg, South Africa, May 2016 (https://www.aims.ac.za/assets/files/Workshops/2016-Workshops/Flyer_AIMS-1.pdf). I also gave an introductory lecture on mathematical epidemiology to the students (in addition to co-organizing a workshop on mathematical epidemiology with Professor Andrea Pugliese)
- Panelist on a parallel session on “Using Data Science to Drive Development”, Global Gathering of Next Einstein Forum, Dakar, Senegal, March 2016 (<http://gg2016.nef.org/agenda-day-2/>).

- Keynote lecture on “Modeling Bovine TB Dynamics”, 3rd Joint UNISA-UP Workshop on Theoretical and Mathematical Epidemiology, Pretoria, South Africa, February-March, 2016 (http://www.up.ac.za/media/shared/639/ZP_Resources/pre-workshop-and-workshop-program-24-feb-2016-v19.zp80357.pdf)

2015

- Invited lecture, Department of Electrical and Computer Engineering, University of Manitoba, Canada, September 15, 2015.
- Plenary lecture, Erice MathCompEpi2015, Erice, Italy, August 29- September 5, 2015.
- Invited lecture, SMB Annual Meeting, Georgia State University, Atlanta, Georgia, June 30-July 3, 2015.
- Invited lecture on enhancing excellence in mathematical sciences in Nigeria, National Science Summit, Abuja, Nigeria, May 12-13, 2015.
- Distinguished lecture, University of Ilorin, Nigeria, May 25, 2015.
- Plenary lecture, South African Symposium on Numerical and Applied Mathematics, University of Pretoria, South Africa, March 30, April 1, 2015.

2014

- Plenary lecture on “Mathematical analysis of the role of temperature variations on malaria transmission dynamics” at a workshop on Optimal Decision-Making in Economics, Healthcare and Sustainable Ecosystems, Khlaifa University, United Arab Emirates, December 2014.
- Invited lecture on “Modeling Effect of Climate Change on Malaria Transmission Dynamics”. School of Mathematical and Natural Sciences colloquium, November 2014.
- . Seminar on “Dynamically-Consistent Nonstandard Finite-difference Discretization of Continuous-time Models”. Applied and Computational Mathematics seminar series (inaugural group seminar), School of Mathematical and Natural Sciences, Arizona State University, November 2014.
- Invited lecture on “Challenges and opportunities in disease modeling: The case for Dengue”. First International and Interdisciplinary Workshop on the Ecology, Evolution and Dynamics of Dengue, Arizona State University, August 2014.
- Invited lecture on “Modeling the Spread and Control of Infectious Diseases” (I co-organized this special session). AIMS Conference on Dynamical Systems, Differential Equations and Applications, Madrid, Spain, Jul 2014 (with T. Malik).

1996-2013

- Invited lecture, CMS Winter Meeting, Ottawa, December 2013.
- Plenary lecture, Biomat 2013, Fields Institute, Toronto, November 2013.
- Invited lectures, Arizona State University (West and Tempe campuses), October 2013.
- Plenary lecture, 8th Pan African Congress of Mathematicians, Abuja, Nigeria, July 2013.
- Invited lecture, AMS Joint Meetings, San Diego, USA, January 2013.

- Invited lecture, Workshop on Major and Neglected Diseases in Africa, University of Ottawa, May 2013.
- Invited lecture, 9th AIMS Conference on Dynamical Systems and Differential Equations. Orlando, Florida, USA, July 1-5, 2012.
- Invited lecture, Canadian Applied and Industrial Mathematics Conference. Fields Institute, Toronto, Canada. June 24-28, 2012.
- Two invited lectures at ICIAM 2011, Vancouver, Canada. July 2011.
- Plenary lecture, International Conference on Mathematical and Computational Biology, University Putra Malaysia, Malaysia. April 2011.
- Invited lecture at the annual meeting of the Canadian Applied and Industrial Mathematical Society, Memorial University of Newfoundland, St. John's, Canada. July 2010.
- Invited lecture at the Canadian Mathematical Society summer conference, University of New Brunswick, Fredericton, Canada. May 2010.
- Plenary lecture, Atlantic Mathematical Biology Workshop, University of New Brunswick, Fredericton, Canada. June, 2010.
- Distinguished seminar, Department of Mathematics, Memorial University of Newfoundland, St. John's, Canada. February 2010.
- Public lecture on the use of mathematics to understand human diseases. University of Manitoba, October 2009.
- Invited talk at the 28th Annual Conference of the Nigerian Mathematical Society, University of Ilorin, Nigeria, June 2009.
- Distinguished lecture, National Mathematical Centre, Abuja, Nigeria. July 2009.
- Distinguished seminar, Ahmadu Bello University, Zaria, Nigeria. July 2009.
- Invited talk at the Annual Meeting of the Canadian Applied and Industrial Mathematical Society, London, Ontario, June 2009.
- Invited seminar at the Mathematical Biosciences Institute, Columbus, Ohio, USA, May 2009.
- Plenary talk at the First International Conference on the Mathematical Sciences, University of Buea, Cameroon, May 2009.
- Invited talk at the Canadian Mathematical Society Summer Meeting, Memorial University, St. John's, Newfoundland, Canada, June 2009.
- Invited talk at the Society of Mathematical Biology Conference. University of Toronto, July 30-August 2, 2008.
- Plenary presentations at Botswana Summer School, August 18-29, 2008.
- Invited talk at the 7th AIMS International Conference on Dynamical Systems, Differential Equations and Applications. University of Texas at Arlington, USA, May 18-21, 2008.

- Dynamical Systems Theories and Techniques in Epidemiology. Workshop on “Trends in Mathematical and Computer Sciences” organized by International Centre of Mathematical and Computer Sciences and the National Universities Commission, Abuja, Nigeria, October 2007.
- Mathematical epidemiology of HIV/AIDS. DIMACS-SACEMA-AIMS conference on Mathematical Epidemiology, Stellenbosch, South Africa, June 2007.
- HIV epidemiology: some new results and challenges. Canada-China Epidemiology Meeting, Peking University, Beijing, China. May 2007.
- Some new results and challenges in modelling HIV epidemiology. Mathematical Biology Workshop, University of Nairobi, Kenya, December 2006.
- Modeling transmission dynamics of HIV/AIDS and co-Infection with other diseases: some results, issues, and challenges. DIMACS-SACEMA Workshop on Facing the Challenge of Infectious Diseases in Africa: The Role of Mathematical Modeling, University of the Witwatersrand, Johannesburg, South Africa, Sept. 2006 (I was chair of Program Committee).
- Modelling HIV/AIDS transmission and control. Bayero University Kano, Nigeria, August 2006.
- Backward bifurcations in HIV models. SIAM Annual Meeting, Boston, July 10-14, 2006 (I organized 4 minisymposia).
- Dynamics analysis of HIV vaccine models. CMS Summer Meeting, University of Calgary, June 3-5, 2006.
- Vaccination models for HIV epidemiology. Arizona State University, Mathematical Biology Seminar Series. April 2006.
- Modelling the impact of an imperfect vaccine and anti-retroviral therapy in curtailing HIV spread. Canadian Mathematical Society Winter Meeting, University of Victoria, December 2005.
- Dynamical model for multiple-drug resistant tuberculosis with exogenous re-infection. AMS-IMS-SIAM Joint Summer Research Meeting on Modelling the Dynamics of Human Diseases: Emerging Paradigms and Challenges. Snowbird Summer and Ski Resort, Utah, July 2005 (with B. Song).
- Optimal vaccine allocation strategies for heterogeneous populations. AMS-IMS-SIAM Joint Summer Research Meeting on Modelling the Dynamics of Human Diseases: Emerging Paradigms and Challenges. Snowbird Summer and Ski Resort, Utah, July 2005 (with C. Bowman).
- The Design of nonstandard finite-difference methods for epidemiological models. SIAM Annual Meeting, New Orleans, July 2005.
- Modelling the impact of imperfect vaccines for some infectious diseases. DIMACS Working Group on Comparing Vaccine Strategies, DIMACS Center, Rutgers University, May 2004.
- Mathematical approaches for assessing potential impact of HIV vaccines. Distinguished PIMS-MITACS Mathematical Biology Seminar Series, Centre for Mathematical Biology, University of Alberta, December 2004.
- Towards a global strategy for curtailing the AIDS pandemic. Lecture presented at the Inaugural MITACS Seminar Series, York University, October 2004.

- Modelling the impact of some anti-HIV Control strategies. Joint CAIMS/CMS Summer Conference, Dalhousie University, June 2004 (30 minutes).
- Modelling the impact of vaccination on disease control. International Conference on Dynamical Systems and Differential Equations (ICDSDE 2004), California State Polytechnic University, Pomona, California, USA, June 2004 (I co-organized the Special Session) (30 minutes).
- Mathematical approaches for controlling infectious diseases. To be presented at the Southern African Mathematical Sciences Association Conference (SAMSA 2004), University of the North, South Africa, November-December, 2004 (1 hour plenary talk).
- Mathematical approaches for emerging and re-emerging infectious diseases: emphasis on SARS and HIV. Medalist Talk, International Conference for Mathematical Sciences, University of Agriculture, Abeokuta, Nigeria, November 2003 (1 hour plenary talk).
- Mathematics of SARS. Distinguished Seminar Series, Department of Mathematics, University of Michigan, Ann Arbor, October 2003 (1 hour).
- Using mathematics to understand HIV pathogenesis and epidemiology. Department of Mathematics, North Carolina A&T, October 2003. Paper also presented at Institute of Bio-diagnostic, National Research Laboratory (NRC), Winnipeg, February 2003 (1 hour).
- Towards a global strategy for SARS. MITACS meeting on SARS, Banff, Calgary, September 2003 (1 hour).
- Modelling SARS outbreaks in the GTA. CAARMS9, Purdue University, USA, June 2003 (1 hour plenary talk).
- Mathematics of SARS. Distinguished Seminar Series, University of Michigan, Ann Arbor, October 2003.
- S.M. Moghadas and A.B. Gumel. Using Poincaré Index to analyze an epidemic model with bi-stable equilibria. 5-th Americas Conference on Differential Equations and Nonlinear Dynamics. University of Alberta, July 2002.
- Dynamics analysis of the effect of condom use on HIV epidemiology. Canadian Mathematics Society Summer Meeting, University Laval, Quebec City, June 2002 (30 minutes).
- Dynamics analysis of an epidemic model with non-linear incidence. Fifth Americas Conference on Differential Equations and Nonlinear Dynamics. University of Alberta, July 2002 (30 minutes).
- A.B. Gumel, Xuewu Zhang, P.N. Shivakumar, M.L. Garba and B.M. Sahai. Modelling and assessment of therapeutic strategies for HIV infection. 11th Annual Conference on HIV/AIDS Research, Winnipeg, April 2002 (abstract appeared in Canadian Journal of Infectious Disease, 13A March-April 2002, page 23A, Abstract #152P).
- A.B. Gumel. Numerical modelling of the perturbation of HIV-1 during combination therapy. The Annual Meeting of the Canadian Applied and Industrial Mathematics Society, University of Victoria, Canada, 2001.
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- An explicit, chaos-free, non-standard scheme for an epidemiological model. International Conference on Scientific Computing and Differential Equations (SCICADE), Vancouver, July/August 2001 (20 minutes).
- A family of L_0 -stable parallel methods for solving parabolic partial differential equations. National Mathematics Centre, Abuja, Nigeria and Bayero University, Nigeria, May 2000 (1 hour).
- Numerical model for the dynamics between HIV and CD4+ T cells in vivo. Canadian Mathematics Society Meeting (Math 2000), McMaster University, June 2000 (20 minutes).
- Numerical methods for some dynamical systems. Dynamical Systems Day, McMaster University, February 1999. Paper also presented at Dept. of Computer Science, University of Toronto, February 1999 (1 hour).
- HIV and anti-viral therapy: a numerical approach. Department of Applied Mathematics, University of Western Ontario, December 1999 (1 hour).
- Numerical modelling of HIV transmission and anti-viral therapy. International Conference on Scientific Computing and Differential Equations, University of Queensland, Australia, August 1999 (20 minutes).
- On the use of the dual-sorption to predict the pharmacokinetic behaviour of a permeant: a numerical approach. SIAM Annual Meeting, University of Toronto, July 1998 (20 minutes).
- Numerical methods for solving a coupled non-linear oscillator. 18th Annual Meeting of the Canadian Applied Mathematical Society. The Fields Institute, Toronto, May/June 1997 (20 minutes).
- A second-order explicit method for a non-linear reaction-diffusion model arising in chemical kinetics. CMS Winter Meeting, University of Victoria, December 1997 (15 minutes).
- A.B. Gumel. Parallel algorithm for the semi-discretised heat equation in two-space dimension. Proceedings of REDECS'96 (National Conference on Research and Developments in Computer Science and its Applications, University Pertanian Malaysia, UPM, Malaysia), 1996 (30 minutes).