

Abba B. Gumel, PhD (abbreviated CV)

The Michael and Eugenia Brin Endowed E-Nnovate Chair in Mathematics,

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Education

University	Duration	Degree Awarded
Brunel University London, United Kingdom	1991-1994	Ph.D. Mathematics
Bayero University, Nigeria	1984-1989	B.Sc. Hons. Mathematics

Research Interests

My research work focuses on using mathematical approaches (modeling, rigorous analysis, and data analytics) to gain insight and provide understanding on the transmission dynamics of emerging and re-emerging infectious diseases of public health significance. Specifically, I design, analyze, parameterize, and simulate novel models for the transmission dynamics and control of emerging and re-emerging infectious diseases. My research also involves the qualitative theory of nonlinear dynamical systems arising in the mathematical modeling of phenomena in population biology (ecology, epidemiology, immunology etc.) and computational mathematics (with emphasis on the design of robust numerical methods that give results that are dynamically-consistent with the governing continuous-time model being discretized). The ultimate objective of my research work, in addition to the development of advanced (and perhaps novel) mathematical theory and methodologies for studying nonlinear dynamical systems arising in population biology, is to contribute to the development of effective public health policy for controlling and mitigating the burden of emerging and re-emerging infectious diseases.

Employment History

- (i) July 2022- to date, Professor & The Eugenia and Michael Brin Endowed E-Nnovate Chair in Mathematics, Department of Mathematics, University of Maryland, College Park (also affiliated with the Institute of Physical Science and Technology and the Department of Biology).
- (ii) July 2014- July 2022: Foundation Professor of Mathematics, Arizona State University:
 - (a) School of Mathematical and Statistical Sciences (SoMSS), College of Liberal Arts and Sciences: July 1, 2015 to date
 - (b) School of Mathematical and Natural Sciences (MNS), New College for Interdisciplinary Arts and Sciences & Simon A. Levin Mathematical, Computational and Modeling Sciences Center: July 1, 2014– July 1, 2015
- (iii) 2005- 2014: Professor, Department of Mathematics, University of Manitoba, Canada.
- (iv) 2002-to 2005: Associate Professor, Department of Mathematics, University of Manitoba, Canada.
- (v) 1999-2002: Assistant Professor, Department of Mathematics, University of Manitoba, Canada.
- (vi) 1998-1999: Research Fellow (non-program visitor), Fields Institute for Research in Mathematical Sciences, Toronto, Canada.

- (vii) 1997-1998: Associate Professor, Faculty of Information Technology, University Telekom Malaysia.
- (viii) 1994-1995: Lecturer, Faculty of Information Technology, University Malaysia Sarawak.

Research Awards and Honors

1. Fellow of Society for Industrial and Applied Mathematics (SIAM), Class of 2022
2. Winner of 2021 Bellman Prize (with former graduate student, Dr. K. Okuneye): this biennial award is given to the author(s) of a paper published in the journal *Mathematical Bioscience* that has made outstanding contribution to the research field over the last five years.
3. Selected to give the 2021 Einstein Public Lecture in Mathematics by the American Mathematical Society. The Einstein lecture series was started by the American Mathematical Society in 2005 to mark the centennial anniversary of Einstein's Miracle Year (1905) when he published those four papers that revolutionized modern Physics and changed the world. Each year, the American Mathematical Society selects a distinguished mathematician to give the Einstein lecture during one of its sectional meetings.
4. Appointed Fellow of African Scientific Institute (www.asi-org.net) (May 2020).
5. Appointed Founding Fellow of ASU-Santa Fe Institute Center for Biosocial Complex Adaptive Systems (January 2015).
6. Appointed Extraordinary Professor, Department of Mathematics and Applied Mathematics, University of Pretoria, South Africa (2014-2021).
7. Merit Award for research excellence in 2011, given by the University of Manitoba and the University of Manitoba Faculty Association (given in May 2012). **Eight awards are given each year, under the research category, throughout the campus.**
8. Merit Award for research excellence in 2010, given by the University of Manitoba and the University of Manitoba Faculty Association (given in June 2011).
9. Elected Fellow of the Nigerian Academy of Science (FAS): 2010.
10. Elected Fellow of the African Academy of Sciences (FAAS): 2009.
11. Received the 2009 Lindsay E. Nicolle Award for the best paper published in the *Canadian Journal of Infectious Diseases and Medical Microbiology*. June 2009, Toronto, Canada. (The award, given annually, is for an author who has made a significant contribution to infectious diseases and medical microbiology, as demonstrated by the impact of their original research published in the journal).
12. Merit Award for research excellence in 2008, given by the University of Manitoba and the University of Manitoba Faculty Association (given in June 2009).
13. University of Manitoba award for Outstanding Outreach, December 2008. **One award is given each year.**
14. Merit Award for research excellence in 2007, given by the University of Manitoba and the University of Manitoba Faculty Association (given in June 2008).

15. Winner of Rh. Award for outstanding contributions to interdisciplinary scholarship and research, 2004. **This is the highest research award given to junior faculty at the University of Manitoba.**
16. Young African Mathematician Medal (Applied Mathematics), given by the African Mathematical Union (International Conference of Mathematical Sciences, University of Agriculture, Abeokuta, Nigeria, November 2003). This award is given to an African mathematician, under the age of 40, for research contribution and potential.
17. Manitoba Science and Technology Certificate of Achievement, 2003.
18. Listed as one of the greatest mathematicians of the 1990s on the database of the Mathematicians of the African Diaspora (<http://www.math.buffalo.edu/mad/madgreatest.html>).

Professional Affiliations

- Lifetime member, Canadian Applied and Industrial Mathematics Society (CAIMS);
- Member, American Mathematical Society (AMS);
- Member, Society of Industrial and Applied Mathematics (SIAM);
- Member, Nigerian Mathematical Society (NMS);
- Member, Society for Mathematical Biology (SMB).

Current Editorial Board Membership

1. Associate Editor, Infectious Disease Modelling (2021-to date)
2. Associate Editor, Journal of Difference Equations and Applications (2017-to date)
3. Associate Editor, Africa Matematika (2013-to date)
4. Associate Editor, Mathematical Biosciences (2013-to-date)
5. Associate Editor, Journal of Biological Systems (2010-to date).
6. Associate Editor, Journal of the Nigerian Mathematical Society (2009-to date).
7. Associate Editor, African Diaspora Journal of Mathematics (2008- to date).
8. Associate Editor, Mathematical Biosciences and Engineering (2006-to date).

Community Involvement

1. Member, Finance Committee, Society of Mathematical Biology (2021-to date).
2. Member, Human Resource Advisory Committee, Mathematical Science Research Institute (MSRI) (2020-to date).
3. Chair, AMS Western Section Committee (February 1, 2020 - January 31, 2022).
4. Member, AMS Clayton-Gilmer Fellowship Selection Committee (2021-to date).

5. **Participation in Mathematical Associations:** I served two terms as Secretary (2007-2009 and 2009-2011) of the Canadian Applied and Industrial Mathematics Society. I also served on its Membership Committee (2001-2003). I hosted its 26th Annual Meeting (University of Manitoba, Winnipeg; June 16-18, 2005) and co-hosted the 32nd Annual Meeting (Fields Institute, Toronto; June 24-28, 2012). I am currently serving on its Cecil Graham Doctoral Dissertation Awards committee;
6. **Representative at Fields Institute:** I represented the University of Manitoba at the Fields Institute for Research in Mathematical Sciences, Toronto (2000-2014);
7. **Training Program in Africa:** I helped form and run the US-Africa Biomath Initiative, a capacity building training program in Mathematical Biology in Africa, spearheaded by DIMACS (2006-2012): <http://dimacs.rutgers.edu/AfricanInitiative.html>. The effort was also supported by other centers within the USA, Canada and Africa, including Mathematical Biosciences (MBI; Ohio State University), Canada's MITACS (Mathematics of Informational Technology and Complex Systems), African Institute of Mathematical Sciences, Muizenberg, South Africa and the Southern Africa Centre for Epidemiological Modeling and Analysis (SACEMA);
8. **African Institute of Mathematical Sciences (AIST) Project:** I was appointed to serve on the African Scientific Committee of the AIST Project (2005-to date). The Committee, formed by the Nelson Mandela Institution, consists of some of the most accomplished African scientists and engineers (it is headed by Professor Wole Soboyejo of the Department of Mechanical and Aerospace Engineering at Princeton University; he is currently the President of the African University of Science and Technology, Abuja (<http://aust-abuja.org/>)). Its mandate is to design state-of-the art curriculum for the proposed four AIST nodes across Africa (the first of such campuses, the African University of Science and Technology, became operational in Abuja, Nigeria, in 2008). The aim of the AIST project is to produce world-class African graduates in STEM disciplines, who can help towards the creation of a sustainable knowledge-based economy in Africa. The pan African AIST project is modelled after India's Institute of Technology (IIT) system. The second AIST campus has been built in Arusha, Tanzania (<http://www.nm-aist.ac.tz/>).
9. **International Scientific Advisory Committee, National Mathematical Centre (NMC), Abuja, Nigeria:** I was appointed to serve on the International Scientific Advisory Committee of the National Mathematical Centre, Abuja in 2007. Other members of the Committee include Professor Aderemi Kuku (President, African Academy of Sciences), Professor Phillip Griffith (former Director, Institute for Advanced Study, Princeton University; and the Chair of the Committee), Professor K.R. Sreenivasan (Former Director, International Centre of Theoretical Physics (ICTP), Trieste, Italy), Professor Michiel Hazewinkel (Editor, Encyclopedia of Mathematics), Professor Mohammed Hassan (Executive Director, Third World Academy of Sciences; Former President, African Academy of Science), Professor Aderemi Kuku (Grambling State University, USA), Professor Saliou Toure (President, University of Grand-Bassam, Ivory Coast), Professor Robert Bryant (Director, Mathematical Sciences Research Institute (MSRI), Berkeley, California, USA).
10. **Teaching at Graduate Summer Schools:**
 - Hands-on Research in Complex Systems School, International Centre for Theoretical Physics, Trieste, Italy, July-August, 2019. I conducted a two-week training session on mathematical biology. The School provides early stage researchers, from developing nations, with interactive experiences of hands-on research involving table-top experiments with computer data acquisition and mathematical modeling (<http://indico.ictp.it/event/8701/>).

- 5th Strathmore International Mathematics Conference, Strathmore University, Nairobi, Kenya, August 12 - 16, 2019. I conducted a 2-day Pre-conference Workshop on Mathematical Biology.
(<https://www.strathmore.edu/simc2019/>).
 - BIOMATH 2017: International Conference on Mathematical Methods and Models in Biosciences and a School for Young Scientists, Kruger National Park, South Africa, June 2017 (<http://www.biomath.bg/2017/committees.php>), hosted by the University of Pretoria (where I hold an adjunct appointment).
 - I helped conduct the 2017 Summer Course on Modeling and Analysis of Infectious Disease, National Taiwan University, Taipei, Taiwan, July 10-20, 2017 (http://ncts.ntu.edu.tw/templet1_2/index.php?nid=98).
 - 2011 AARMS Summer School (Memorial University of Newfoundland, St. John's; June 2011)
 - 9th PIMS Graduate Industrial Modelling Camp and Industrial Problem-solving Workshop, Simon Fraser University, 2006;
 - AMMSI Mathematical Epidemiology workshop, Nairobi, Kenya; December 2006
 - 10th Graduate Industrial Modelling Camp and Industrial Problem-solving workshop, University of Alberta, June 2007.
 - DIMACS-SACEMA-AIMS Summer School in Mathematical Biology, African Institute of Mathematical Sciences (AIMS), Muizenberg, South Africa, June 2007. We have held similar Summer Schools in Botswana, Uganda, Kenya etc.
11. **Co-Director, Prairie Network for Research in the Mathematical Sciences:** I helped form the Prairie Network for Research in the Mathematical Sciences in 2007. The main objective of the Network, consisting of five prairie universities (Brandon University, University of Manitoba, University of Regina, University of Saskatchewan and University of Winnipeg), was to encourage and advance the course of mathematical sciences in the provinces of Manitoba and Saskatchewan. I was the Chair of the Coordinating Committee (that formed the Network). I served as Co-Director of the Network 2007-2012.
 12. **Canada-Africa Biomath Network.** I helped form the Canada-Africa Biomath Network in 2007. The Network, consisting of researchers from Canada and Africa and put together by MITACS (Mathematics of Information Technology and Complex Systems; one of Canada's Centres of Excellence) was aimed at using mathematical approaches to find cost-effective ways to combat the spread of diseases endemic in Africa, such as HIV/AIDS, malaria and tuberculosis. The Network was formally launched in Kampala, Uganda, November 11-14, 2007 (I chaired its Steering Committee).
 13. **International Mathematical Union:** I was invited by the International Mathematical Union to give input on the "Mathematics in Africa: Challenges and Opportunities" in 2009. This resulted in a report prepared for the Templeton Foundation (http://www.mathunion.org/fileadmin/IMU/Report/Mathematics_in_Africa_Challenges___Opportunities.pdf).
 14. **Scientific Committee, Africa Mathematics Project, Simons Foundation:** I was invited to serve on the Scientific Committee to advise the Simons Foundation on funding proposals for the Africa Mathematics Project (<https://simonsfoundation.org/mps-africa-mathematics-project>). Committee members: Professor Sir John Ball (Oxford University; Past President of the International Mathematical Union; Committee Chair), Professor Augustin Banyaga (Pennsylvania State University, USA), Professor Jean Pierre Bourguignon, (IHES, France), Professor

Alicia Dickenstein (Universidad de Buenos Aires, Argentina), Professor Abba Gumel (then at University of Manitoba, Canada) and Professor Peter Sarnak (Institute for Advanced Study, Princeton University, USA).

15. **African Mathematical Institutes Network (AMInet)**: I am involved with the AMInet project, a network of institutes for training in the mathematical sciences in Africa. The project aims to replicate the success of the African Institute of Mathematical Sciences (AIMS), South Africa. AIMS, supported by five universities (University of Stellenbosch, University of Cambridge, University of Cape Town, University of Oxford, University of Paris-Sud, and University of the Western Cape), is a pan African institute that helps African undergraduates of mathematical sciences to fill the gaps in their training (to better-prepare them for rigorous graduate studies in the mathematical sciences). Canada donated \$20 million to support five AMInet nodes in 2010.
16. Member, Scientific Advisory Committee of the Mathematical Biosciences Institute, Ohio State University (2012-2015).
17. Member, Global Outreach Committee of Society of Mathematical Biology (2007-2017).

Research-related Media Appearances and Activities

1. Media events on COVID-19 modelling research (2020-2021): available at the website https://math.la.asu.edu/~gumel/covid_19_news.html;
2. Mathematics of SARS. Global Television, Winnipeg, April 30, 2003;
3. SARS modelling. CBC Newsworld TV, Banff, Alberta, September 5, 2003...live interview;
4. SARS modelling. A Channel Television (Calgary), September 5, 2003;
5. SARS: fighting a mystery killer. Winnipeg Free Press, May 3, 2003;
6. Hot Seat. One hour Nigerian Television Abeokuta program, in conjunction with my medal award by the African Mathematical Union and international conference of mathematical sciences, Abeokuta, Nigeria, November 27, 2003. I also gave interviews to other media stations (e.g., African International Television, Radio Abeokuta, Nigerian Television Authority, Lagos etc.) during that period;
7. My Word, University of Manitoba Bulletin, March 25, 2004.
8. Breakfast Television, City TV, Winnipeg, November 20, 2007 (discussed the newly-formed Canada-Africa Biomath Network). Related newspaper articles appeared in two local newspapers (Winnipeg Free Press and The Sun).
9. Media appearances on modelling swine pandemic influenza (2009). I gave a public lecture on the topic in October 2009.

(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
151. Iboi Enahoro, Steffen Eikenberry, Abba B. Gumel, Silvie Huijben and Krijn Paaijmans. Long-lasting insecticidal nets and the quest for malaria eradication: A mathematical modeling approach. *Journal of Mathematical Biology*. 81(2020): 113-158.

150. Jemal Mohammed-Awel, Iboi Enahoro and Abba Gumel. Insecticide resistance and malaria control: A genetics-epidemiology modeling approach. *Mathematical Biosciences*. 325(2020): 108368.
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.
145. Kamaldeen Okuneye, Steffen Eikenberry and Abba Gumel. Weather-driven malaria transmission model with gonotrophic and sporogonic cycles. *Journal of Biological Dynamics*. **13**(1)(2019): 288-324.
144. Jemal Mohammad-Awel and Abba Gumel. Mathematics of an epidemiology-genetics model for assessing the role of insecticides resistance on malaria transmission dynamics. *Mathematical Biosciences*. 312(2019): 33-49.
143. Attila Denes and Abba Gumel. Modeling the impact of quarantine during an outbreak of Ebola virus disease. *Infectious Disease Modeling*. 4(2019): 12-27.
142. Steffen Eikenberry and Abba Gumel. Mathematical modeling of climate change and malaria transmission dynamics: a historical review. *Journal of Mathematical Biology*. 77(4)(2018): 857-933.
141. Rahim Taghikhani and Abba Gumel. Mathematical assessment of the role of vertical transmission and temperature variability on dengue transmission dynamics. *Infectious Disease Modeling*. 3(2018): 266-292.
140. Enahoro Iboi and Abba Gumel. Mathematical assessment of the roles of temperature and Dengvaxia vaccine on the transmission dynamics of Dengue serotypes. *Mathematical Biosciences*. 304(2018): 25-47.
139. A. B. Gumel, J. M.-S. Lubuma, O. Sharomi and Y. A. Terefe. Mathematics of a sex-structured model for Syphilis transmission dynamics. *Mathematical Methods in the Applied Sciences*. 41(18)(2018): 8488-8513.
138. D. Okuonghae, A.B. Gumel, Bernard Ikhimwin and Enahoro Iboi. Mathematical assessment of the role of early latent cases on Syphilis transmission dynamics. *Acta Biotheoretica* (2018). <https://doi.org/10.1007/s10441-018-9336-9>.

137. Jemal Mohammed-Awel, Folashade Agosto, Ronald E. Mickens and Abba B. Gumel. Mathematical assessment of the role of vector insecticide resistance and feeding/resting behavior on malaria transmission dynamics: Optimal control analysis. *Infectious Disease Modelling*. 3(2018): 301-321.
136. D. Garba, S.M. Garba and A.B. Gumel. Modelling the transmission dynamics of Feline immunodeficiency virus (FIV) and Bovine tuberculosis (BTB) in lion-buffalo population. *Mathematical Methods in the Applied Sciences*. 41(18)(2018): 8697-8723.
135. Kamaldeen Okuneye, Ahmed Abdelrazec and Abba Gumel. Mathematical analysis of a weather-driven model for population ecology of mosquitoes. *Mathematical Biosciences and Engineering*. 15(1)(2018): 57-93.
134. Andrea Pugliese, Abba Gumel, Fabio Milner and Jorge Velasco-Hernandez. Sex-biased prevalence in infections with heterosexual, direct, and vector-mediated transmission: a theoretical analysis. *Mathematical Biosciences and Engineering*. 15(1)(2018): 125-140.
133. N. Hussaini, K. Okuneye and A. Gumel. Mathematical analysis of a model for zoonotic visceral leishmaniasis. *Infectious Disease Modeling*. 2(2017): 455-474.
132. C. Raina MacIntyre, Thomas Edward Engells, Matthew Scotch, David James Heslop, Abba B. Gumel, George Poste, Xin Chen, Wesley Herche, Kathleen Steinhofel, Samsung Lim and Alex Broom. Converging and emerging threats to health security. *Environment Systems and Decisions*. <https://doi.org/10.1007/s10669-017-9667-0>.
131. Kamaldeen O. Okuneye, Jorge Velasco-Hernandez and Abba Gumel. The “unholy” Chikungunya-Dengue-Zika trinity: a theoretical analysis. *Journal of Biological Systems*. 25(4)(2017): 545-585.
130. Ahmed Abdelrazec and Abba B. Gumel. Mathematical assessment of the role of temperature and rainfall on mosquito population dynamics. *Journal of Mathematical Biology*. 74(2017): 1351-1395.
129. O. Sharomi, M. Safi, A.B. Gumel and D. Gerberry. Exogenous re-infection does not always cause backward bifurcation in TB transmission dynamics. *Applied Mathematics and Computation*. 298(2017): 322-335.
128. Lindsay A. Simpson and Abba B. Gumel. Mathematical assessment of the role of pre-exposure prophylaxis on HIV transmission dynamics. *Applied Mathematics and Computation*. 293(2017): 168-193.
127. Kamaldeen Okuneye and Abba B. Gumel. Analysis of a temperature- and rainfall-dependent model for malaria transmission dynamics. *Mathematical Biosciences*. 287(2017): 72-92. (**This paper won The 2021 Bellman Prize**).
126. A. Javame and A.B. Gumel. Qualitative study of the role of Pap screening on HPV transmission dynamics. *Journal of Nigerian Mathematical Society*. 35(2016): 580-641.
125. N. Hussaini, J. M-S Lubuma, K. Barley and A.B. Gumel. Mathematical analysis of a model for AVL-HIV co-endemicity. *Mathematical Biosciences*. 271(2016): 80-95.
124. T. Malik, A. Alsaleh, A. Gumel and M. Safi. Optimal strategies for controlling the MERS coronavirus during a mass gathering. *Global Journal of Pure and Applied Mathematics*. 11(6)(2015): 4851-4865.

123. F. Agosto, A.B. Gumel and P.E. Parham. Qualitative assessment of the role of temperature variations on malaria transmission dynamics. *Journal of Biological Systems*. 23(4)(2015): 1-34.
122. F. Agosto, M. Teboh-Ewungkem and A.B. Gumel. Mathematical assessment of the role of traditional beliefs system and customs and health-care settings on the transmission dynamics of the 2014 Ebola outbreaks. *BMC Medicine*. 13(2015): 96
121. D. Okuonghae, A.B. Gumel and M. Safi. Dynamics of a two-strain vaccination model for Polio. *Nonlinear Analysis Series B: Real World Applications*. 25(2015): 167-189. **This paper was listed among Top25 Hottest Articles for April-June, 2015** (<http://top25.sciencedirect.com/subject/mathematics/16/journal/nonlinear-analysis-real-world-applications/14681218/archive/65/>).
120. Paul E. Parham, Joanna Waldock, George K. Christophides, Deborah Hemming, Folashade Agosto, Katherine J. Evans, Nina Fefferman, Holly Gaff, Abba Gumel, Shannon LaDeau, Suzanne Lenhart, Ronald E. Mickens, Elena Naumova, Richard Ostfeld, Paul Ready, Matthew Thomas, Jorge Velasco-Hernandez and Edwin Michael. Climate, environmental, and socio-economic change - weighing up the balance in vector-borne disease transmission. *Philosophical Transaction of the Royal Society B*. 370(2015): 20130551.
119. F. Nazari, A.B. Gumel and E.H. Elbasha. Differential characteristics of primary infection and reinfection cause backward bifurcation in HCV transmission dynamics. *Math. Biosci.* 263(2015): 51-69.
118. S.M. Garba, A.B. Gumel, A.S. Hassan and J.M-S Lubuma. Switching from exact scheme to nonstandard finite difference scheme for linear delay differential equation. *Applied Mathematics and Computation*. 258 (2015): 388-403.
117. M. Safi and A.B. Gumel. Dynamics of quarantine model in two patches. *Mathematical Methods in the Applied Sciences*. 38 (2)(2015): 349-364.
116. Adamu Shitu Hassan, Salisu Garba, A. Gumel and J. M S Lubuma. Dynamics of mycobacterium and bovine tuberculosis in human and African buffalo populations. *Computational and Mathematical Methods in Medicine*. 2014, Art. ID 912306, 20 pp.
115. F. Forouzannia and A.B. Gumel. Dynamics of an age-structured two-strain model for malaria transmission. *Applied Mathematics and Computation*. 250(2015): 860-886.
114. A. Alsaleh and A.B. Gumel. Analysis of risk-structured vaccination model for the dynamics of oncogenic and warts-causing HPV types. *Bulletin of Mathematical Biology*. 76(7)(2014): 1670-1726.
113. L.H. Thompson, M.T. Malik, A. Gumel, T. Strome and S.M. Mahmud. Emergency department and “Google flu trends” data as syndromic surveillance indicators for seasonal influenza. *Epidemiology and Infection*. (2014): 1-9.
112. A. Alsaleh and A.B. Gumel. Dynamics analysis of a vaccination model for HPV transmission. *Journal of Biological Systems*. 22(4)(2014): 555-600.
111. F. Forouzannia and A.B. Gumel. Mathematical analysis of an age-structured model for malaria. *Math. Biosci.* 247(2014): 80-94. **This paper is listed among the most downloaded articles in ScienceDirect over the last 90 days** (<http://www.journals.elsevier.com/mathematical-biosciences/most-downloaded-articles>).

110. M.A. Safi, A.B. Gumel and E.H. Elbasha. Qualitative analysis of an age-Structured SEIR epidemic model with treatment. *Applied Mathematics and Computation*. 219(22)(2013): 10627-10642.
109. M.A. Safi, D.Y. Melesse and A.B. Gumel. Dynamics analysis of a multi-strain cholera model with an imperfect vaccine. *Bulletin of Mathematical Biology*. 75(2013): 1104-1137.
108. F.B. Augusto and A.B. Gumel. Qualitative dynamics of lowly- and highly-pathogenic avian influenza strains. *Mathematical Biosciences*. 243(2)(2013): 147-162. **This paper is listed third of the Top25 Hottest Articles published in the journal for October-December 2013** (<http://top25.sciencedirect.com/subject/agricultural-and-biological-sciences/1/journal/mathematicalbiosciences/00255564/archive/45>).
107. T.M. Malik, J. Reimer, A.B. Gumel, E.H. Elbasha and S. Mahmud. The impact of an imperfect vaccine and pap cytology screening on the transmission of human papillomavirus and occurrence of associated cervical dysplasia and cancer. *Mathematical Biosciences and Engineering*. 10(4)(2013): 1173-1205.
106. T.M. Malik, A.B. Gumel and E.H. Elbasha. Qualitative Analysis of an Age- and Sex-structured Vaccination Model for Human Papillomavirus. *DCDS-B*. 18(8)(2013): 2151-2174.
105. S.M. Garba, M.S. Safi and A.B. Gumel. Cross-immunity-induced backward bifurcation for a model of transmission dynamics of two strains of influenza. *Nonlinear Analysis*. 14(3)(2013): 1384-1403.
104. M.A. Safi and A.B. Gumel. Dynamics of a model with quarantine-adjusted incidence and quarantine of susceptible individuals. *Journal of Mathematical Analysis and Applications*. 399(2)(2013): 565-575.
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(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.
- B.D. Corbett and A.B. Gumel. A Chaos-Free Numerical Scheme for a model of HIV transmission. The Annual Meeting of the Canadian Applied and Industrial Mathematics Society (CAIMS), University of Victoria, Canada, 2001.
- 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 L₀-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).