

Abba B. Gumel, PhD (abbreviated CV)

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Education

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

Research Interests

My research is focused on the qualitative theory of systems of non-linear differential equations arising in the mathematical modeling of real-life phenomena occurring in the natural and engineering sciences. It spans three main areas, as briefly described below.

- (i) **Mathematical Biology:** This entails designing, and rigorously analyzing, robust mathematical models for gaining insight into the transmission and control mechanisms of some emerging and re-emerging human diseases of public health importance. The models, which typically take the form of systems of deterministic non-linear autonomous (or non-autonomous) differential equations, are used to design effective strategies for controlling the spread of diseases in a given population.
- (ii) **Non-linear Dynamical Systems:** This involves designing new theories and methodologies for analysing the qualitative dynamics of autonomous and non-autonomous dynamical systems associated with the mathematical modelling of real-life phenomena arising in the natural and engineering sciences. Emphasis is on establishing the existence and uniqueness of solutions, analysing the existence and asymptotic stability of associated steady-state solutions and characterizing bifurcation types.
- (iii) **Computational Mathematics:** I am primarily interested in the design of dynamically-consistent finite-difference methods for solving non-linear dynamical systems associated with the mathematical modelling of physical phenomena arising in the natural and engineering sciences. The objective is that the resulting numerical methods are free of scheme-dependent instabilities (such as contrived oscillations, bifurcations and chaos) and convergence to spurious solutions. I am also interested in designing efficient L_0 -stable finite-difference methods for solving PDEs (on a parallel architecture).

Employment History

- (i) July 2014- to date: Professor of Mathematics (and C. Castillo-Chavez Professor of Mathematical Biology), School of Mathematical and Statistical Sciences, Arizona State University, USA (joint appointment at MNS and SAL MCMSC during 2014-2015 session).
- (ii) 2005- 2014: Professor, Department of Mathematics, University of Manitoba, Canada.
- (iii) 2002-to 2005: Associate Professor, Department of Mathematics, University of Manitoba, Canada.
- (iv) 1999-2001: Assistant Professor, Department of Mathematics, University of Manitoba, Canada.
- (v) 1998-1999: Research Fellow (non-program visitor), Fields Institute for Research in Mathematical Sciences, Toronto, Canada.
- (vi) 1997-1998: Associate Professor, Faculty of Information Technology, University Telekom Malaysia.
- (vii) 1994-1995: Lecturer, Faculty of Information Technology, University Malaysia Sarawak.

Administrative Duties

- (i) Deputy Director, SAL-MCMSC, Arizona State University (July 2014-2015);
- (ii) Director, Institute of Industrial Mathematical Sciences, University of Manitoba (2004- 2012);
- (iii) **Committees:** I have served on numerous departmental and faculty-based committees including the Outreach Committee (I was chair between 2001-2002), Executive Committee, Graduate Studies Committee, Systems, Software and Technology Committee, Search Committee (2003/2004), Search Committee for Physics Department (2002/2003), Hiring Committee for IIMS (2001);
- (iv) Departmental colloquium (seminar) coordinator (2003-2011);
- (v) Represented University of Manitoba at the Fields Institute for Research in the Mathematical Sciences, Toronto (2000-2014);
- (vi) Participated in the department's Mentoring Program for undergraduate students;
- (vii) Hosted the 2005 Annual Meeting of the Canadian Applied and Industrial Mathematics Society (University of Manitoba, June 16-18, 2005);
- (viii) Co-hosted the 2012 Annual Meeting of the Canadian Applied and Industrial Mathematics Society (Fields Institute, Toronto, June 24-28, 2012)
- (ix) Local Chair, CMS-MITACS Conference, Winnipeg, Manitoba, May 2007;
- (x) Secretary, Canadian Applied and Industrial Mathematics Society (2007-2011);
- (xi) Co-Director, Prairie Network for Research in Mathematical Sciences (2007-2012).

Research Awards and Honours

14. Appointed Founding Fellow, ASU-Santa Fe Institute Center for Biosocial Complex Systems (January 2015).
13. Appointed Extraordinary Professor, Department of Mathematics and Applied Mathematics, University of Pretoria, South Africa (2014-2017).
12. 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.**
11. Merit Award for research excellence in 2010, given by the University of Manitoba and the University of Manitoba Faculty Association (given in June 2011).
10. Elected Fellow of the Nigerian Academy of Science (FAS): 2010.
9. Elected Fellow of the African Academy of Sciences (FAAS): 2009.
8. 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).
7. Merit Award for research excellence in 2008, given by the University of Manitoba and the University of Manitoba Faculty Association (given in June 2009).
6. University of Manitoba award for Outstanding Outreach, December 2008. **One award is given each year.**
5. Merit Award for research excellence in 2007, given by the University of Manitoba and the University of Manitoba Faculty Association (given in June 2008).
4. 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.**
3. 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.
2. Manitoba Science and Technology Certificate of Achievement, 2003.
1. 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

- (i) Lifetime member, Canadian Applied and Industrial Mathematics Society (CAIMS).
- (ii) Member, American Mathematical Society (AMS).
- (iii) Member, Society of Industrial and Applied Mathematics (SIAM).
- (iv) Member, Society for Mathematical Biology (SMB).

Editorial Boards

- (i) Associate Editor, Mathematical Biosciences and Engineering (2006-to date).
- (ii) Associate Editor, Journal of the Nigerian Mathematical Society (2009-to date).
- (iii) Associate Editor, Journal of Applied Mathematics (2010-2012).
- (iv) Regional Editor (Africa), International Journal of Computer Mathematics (2007-2009).
- (v) Associate Editor, International Journal of Applied Mathematics and Engineering Sciences (2007-to date).
- (vi) Associate Editor, African Diaspora Journal of Mathematics (2008- to date).
- (vii) Associate Editor, Journal of Zhejiang University Science (2008-to date).
- (viii) Associate Editor, Journal of Biological Systems (2010-to date).
- (ix) Associate Editor, Africa Matematika (2013-to date)
- (x) Associate Editor, Mathematical Biosciences (2013-to-date)

Selected Community Involvement

- a) **Participation in Mathematical Associations:** I have 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;
- b) **Representative at Fields Institute:** I represented the University of Manitoba at the Fields Institute for Research in Mathematical Sciences, Toronto (2000-2014);
- c) **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-to-date): <http://dimacs.rutgers.edu/AfricanInitiative.html>);
- d) **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/>).

- (e) **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).
- (f) **Teaching at Graduate Summer Schools:**
- 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.
- (g) **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.
- (h) **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).
- (i) **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).
- (j) **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). The Committee consists of Professor Sir John Ball of Oxford University (Past President of the International Mathematical Union), Professor Augustin Banyaga (Pennsylvania State University, USA), Professor Jean Pierre Bourguignon, (IHES, France), Professor Aline Bonami (Universit d'Orlans, France), Professor Alicia Dickenstein (Universidad de Buenos Aires, Argentina), Professor Abba Gumel (University of Manitoba, Canada) and Professor Peter Sarnak (Institute for Advanced Study, Princeton University, USA).

- (k) **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.
- (l) Member, Scientific Advisory Committee of the Mathematical Biosciences Institute, Ohio State University (2012-2015).
- (m) Member, Global Outreach Committee of Society of Mathematical Biology (2007-to-date).

Research-related Media Appearances and Activities

- (i) Mathematics of SARS. Global Television, Winnipeg, April 30, 2003;
- (ii) SARS modelling. CBC Newsworld TV, Banff, Alberta, September 5, 2003...live interview;
- (iii) SARS modelling. A Channel Television (Calgary), September 5, 2003;
- (iv) SARS: fighting a mystery killer. Winnipeg Free Press, May 3, 2003;
- (v) 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;
- (vi) My Word, University of Manitoba Bulletin, March 25, 2004.
- (vii) 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).
- (viii) Media appearances on modelling swine pandemic influenza (2009). I gave a public lecture on the topic in October 2009.

Peer-reviewed Publications

- 128. Ahmed Abdelrazec and Abba B. Gumel. Mathematical assessment of the role of temperature and rainfall on mosquito population dynamics. *Journal of Mathematical Biology*. To appear.

127. Lindsay A. Simpson and Abba B. Gumel. Mathematical assessment of the role of pre-exposure prophylaxis on HIV transmission dynamics. *Applied Mathematics and Computation*. To appear.
126. Kamaldeen Okuneye and Abba B. Gumel. Analysis of a temperature- and rainfall-dependent model for malaria transmission dynamics. *Mathematical Biosciences*. <http://dx.doi.org/10.1016/j.mbs.2016.03.013>. **This is one of the most downloaded articles in the journal for the last 90 days** (<http://www.journals.elsevier.com/mathematical-biosciences/most-downloaded-articles>).
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): 167189. **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): 5169.
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): 388403.
117. M. Safi and A.B. Gumel. Dynamics of quarantine model in two patches. *Mathematical Methods in the Applied Sciences*. 38 (2)(2015): 349364.
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): 1670-726.
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. **This is one of the four featured articles in the journal** ([http://www.worldscientific.com/worldscinet/jbs?null&journalTabs=\\$cite](http://www.worldscientific.com/worldscinet/jbs?null&journalTabs=$cite)).
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. Agosto 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.
103. A.B. Gumel. Causes of backward bifurcations in some epidemiological models. *Journal of Mathematical Analysis and Applications*. 395(1)(2012): 355-365.
102. O. Sharomi and A.B. Gumel. Mathematical study of the in-host dynamics of *Chlamydia trachomatis*. *IMA Journal of Applied Mathematics*. 77(2)(2012): 109-139.

101. M.A. Safi, M. Imran and A.B. Gumel. Threshold dynamics of a of a non-autonomous SEIRS model with quarantine and isolation. *Theory in Biosciences*. 131(2012): 19-30.
100. F. Agosto, S. Lenhart, A. Gumel and A. Odoi. Mathematical analysis of a model for the transmission dynamics of bovine tuberculosis. *Mathematical Methods in the Applied Sciences*. 34(15)(2011): 1873-1887.
99. Chandra Podder, Oluwaseun Sharomi, Abba Gumel and Eva Strawbridge. Mathematical analysis of a model for assessing the impact of antiretroviral therapy, voluntary testing and condom use in curtailing HIV. *Differential Equations and Dynamical Systems*. 19(4)(2011): 283-302.
98. O. Sharomi and A.B. Gumel. Mathematical study of a risk-structured two-group model for chlamydia transmission dynamics. *Applied Mathematical Modelling*. 35 (8)(2011): 3653–3673.
97. T. Malik, A. Gumel, L. Thompson, T. Strome and S. Mahmud. Google flu trends and Emergency Department triage data predicted the 2009 pandemic H1N1 waves in Manitoba. *Canadian Journal of Public Health*. 102(4)(2011): 294-297.
96. M.A. Safi and A.B. Gumel. Qualitative study of a quarantine/isolation model with multiple disease stages. *Applied Mathematics and Computation*. 218(5)(2011): 1941-1961.
95. Nafu Hussaini, Mathias Winter and Abba B. Gumel. Qualitative assessment of the role of public health education program on HIV transmission dynamics. *Mathematical Medicine and Biology: A Journal of the IMA*. 28(3)(2011): 245-270.
94. Chandra N. Podder and Abba B. Gumel. Risk-induced backward bifurcation in HSV-2 transmission dynamics. *DCDIS-B*. To appear.
93. M. Safi and A.B. Gumel. Mathematical analysis of a disease transmission model with quarantine, isolation and an imperfect vaccine. *Computers and Mathematics with Applications*. 61(10)(2011): 3044-3070.
92. A. Niger and A.B. Gumel. Immune response and imperfect vaccine in malaria dynamics. *Mathematical Population Studies*. 18(2)(2011): 54-86.
91. E.H. Elbasha, C.N. Podder and A.B. Gumel. Analyzing the dynamics of an SIRS vaccination model with waning natural and vaccine-induced immunity. *Nonlinear Analysis: Real World Applications*. 12(5)(2011): 2692-2705.
90. M. Safi and A.B. Gumel. Effect of incidence function on the dynamics of quarantine/isolation model with time delay. *Nonlinear Analysis Series B: Real World Applications*. 12(1)(2011): 215-235.
89. S.M. Garba, A.B. Gumel and J.M. Lubuma. Dynamically-consistent non-standard finite-difference method for an epidemic model. *Mathematical and Computer Modelling*. 53(2011): 131-150.
88. O. Sharomi and A.B. Gumel. Dynamical analysis of a sex- structured Chlamydia *trachomatis* transmission model with time delay. *Nonlinear Analysis Series B: Real World Applications*. 12(2)(2011): 837-866.
87. O. Sharomi, C. Podder, A.B. Gumel, S. Mahmud and E. Rubinstein. Modelling the transmission dynamics and control of the novel 2009 swine influenza (H1N1) pandemic. *Bulletin of Mathematical Biology*. 73(2011): 515-548.

86. G. Ngwa, A. Nigier and A.B. Gumel. Mathematical assessment of the role of non-linear birth function and maturation delay in the population dynamics of the malaria vector. *Applied Mathematics and Computation*. 217(7)(2010): 3286-3312.
85. Dessalegn Y. Melesse and A.B. Gumel. Global asymptotic properties of an *SEIRS* model with multiple infectious stages. *Journal of Mathematical Analysis and Applications*.366(2010): 202-217. (**This paper was listed among the Top25 Hottest Articles for January-March, 2010**)(<http://top25.sciencedirect.com/subject/mathematics/16/journal/journal-of-mathematical-analysis-and-applications/0022247X/archive/26>).
84. M.A. Safi and A.B. Gumel. Global asymptotic dynamics of a model for quarantine and isolation. *DCDS-B*. 14(1)(2010): 209-231.
83. K. Blayneh, A.B. Gumel, S. Lenhart and T. Clayton. Backward bifurcation analysis and optimal control of West Nile virus. *Bulletin of Mathematical Biology*. 72(4)(2010): 1006-1028.
82. O. Sharomi and A.B. Gumel. Mathematical analysis of HIV treatment model with variable viral load and infection stages. *DIMACS Series in Discrete Mathematics and Theoretical Computer Science*. Volume 75. American Mathematical Society, 2010 (268 Pages). A.B. Gumel and Suzanne Lenhart (eds.)
81. S.M. Garba and A.B. Gumel. Effect of cross-immunity on the transmission dynamics of two strains of dengue. *International Journal of Computer Mathematics*. 87(10)(2010): 2361-2384.
80. Philippe R. S. Lagacé-Wiens, Ethan Rubinstein and Abba Gumel. Influenza epidemiology: past, present and the future. *Critical Care Medicine*. 38(3)(Suppl.)(2010): 1-9.
79. Chandra N. Podder and A.B. Gumel. Qualitative dynamics of a vaccination model for HSV-2. *IMA Journal of Applied Mathematics*. 75(1)(2010): 75-107. Corrigendum to Qualitative dynamics of a vaccination model for HSV-2, *IMA J. Applied Mathematics*, 75(1)(2010): 75-107. *IMA Journal of Applied Mathematics* 76(2011): 217-218.
78. F. Augusto and A.B. Gumel. Theoretical assessment of avian influenza vaccine. *Discrete and Continuous Dynamical Systems B*. 13(1)(2010): 1-25.
77. S.M. Garba and A.B. Gumel. Mathematical recipe for HIV elimination in Nigeria. *Journal of the Nigerian Mathematical Society*. 83(10)(2010): 2361-2384.
76. Miranda I. Teboh-Ewungkem, Chandra N. Podder and Abba B. Gumel. Mathematical study of the role of gametocytes and an imperfect vaccine on malaria transmission dynamics. *Bulletin of Mathematical Biology*. 72(2010): 63-93.
75. O. Sharomi and A.B. Gumel. Reinfection-induced backward bifurcation in the transmission dynamics of *Chlamydia trachomatis*. *Journal of Mathematical Analysis and Applications*. 356(2009): 96-118. (**This paper was listed among the Top25 Hottest Articles for April-June, 2009**)(<http://top25.sciencedirect.php5.office.webpower.nl/subject/mathematics/16/journal/journal-of-mathematical-analysis-and-applications/0022247X/archive/22/>).
74. Lourdes Esteva, A.B. Gumel and Cruz Vargas de Leon. Qualitative study of transmission dynamics of antibiotic-resistant malaria. *Mathematical and Computer Modelling*. 50(3-4)(2009): 611-630.
73. S.A. Adewale, C.N. Podder and A.B. Gumel. Mathematical analysis of a TB transmission model with DOTS. *Canadian Applied Mathematics Quarterly*. 17(1)(2009): 1-36.

72. A. Yadollahi, A. Ashtari and A.B. Gumel. An $O(h^2 + \ell^2)$ method for second-order hyperbolic equations with time-dependent boundary conditions. *International Journal of Applied Mathematics and Engineering Sciences*. 3(1)(2009): 61-74.
71. Chandra Podder and Abba Gumel. Transmission dynamics of a two-sex model for herpes simplex virus Type II. *Canadian Applied Mathematics Quarterly*. 17(2)(2009): 339-386.
70. A.B. Gumel. Global dynamics of a two-strain avian influenza model. *International Journal of Computer Mathematics*. 86(1)(2009): 85-108.
69. Z. Mukandavire, A.B. Gumel, W. Garira and J. M. Tchuente. Mathematical Analysis of a Model for HIV-Malaria Co-infection. *Mathematical Biosciences and Engineering*. 6(2)(2009): 333-362.
68. A. M. Niger and A.B. Gumel. Mathematical analysis of the role of repeated exposure on malaria transmission dynamics. *Dynamical Systems and Differential Equations*. 16(3)(2008): 251-287.
67. M.C. Boily, K. Desai, B. Masse and A.B. Gumel. The incremental role of male circumcision on HIV transmission through its protective effect against other sexually transmitted infections: from efficacy to effectiveness to population-level impact. *Sexually Transmitted Infections*. 84(2008): II28-II34. DOI.
66. L.M. Lix, M.S. Yogendran, W.D. Leslie, S.Y. Shaw, R. Baumgartner, C. Bowman, C. Metgel, A.B. Gumel, J. Hux and R.C. James (2008). Using multiple data features improved the validity of osteoporosis case ascertainment from administrative data. *Journal of Clinical Epidemiology*. 61(12)(2008): 1250-1260
65. O. Sharomi and A.B. Gumel. Dynamical analysis of a multi-strain model of HIV in the presence of antiretroviral drugs. *Journal of Biological Dynamics*. 2(3)(2008): 323-345.
64. T. Day, A. Galvani, C. Struchiner and A.B. Gumel. The evolutionary consequences of vaccination. *Vaccine*. 26(S3)(2008): C1-C3.
63. M. Nuno, T.A. Reichert, G. Chowell and A.B. Gumel. Protecting residential care facilities from pandemic influenza. *Proceedings of the National Academy of Sciences*. 105(30)(2008): 10625-10630.
62. A.B. Gumel and B. Song. Existence of multiple-stable equilibria for a multi-drug-resistant model of mycobacterium tuberculosis. *Mathematical Biosciences and Engineering*. 5(3)(2008): 437-455.
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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.
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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.
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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. L_0 -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, L_0 -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.

Other Publications

- (i) 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;
- (ii) 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.
- (iii) **Edited Book:** 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).
- (iv) **Edited Book:** 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).
- (iv) 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.
- (v) 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.
- (vi) **Edited volume.** *Mathematics of Continuous and Discrete Dynamical Systems*. Contemporary Mathematics Series, American Mathematical Society. Volume 618 (310 Pages), 2014.

Selected Presentations

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).