

Holly Gaff, PhD
Associate Professor

Old Dominion University
Department of Biological Sciences
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EDUCATION

Ph.D. in Mathematics, August 1999
University of Tennessee, Knoxville
Concentration in Mathematical Ecology
Dissertation: Spatial Heterogeneity in Ecological Models: Two Case Studies
Advisor: Dr. Louis Gross

B.S. in Mathematics / Environmental Science, May 1993
Taylor University, Upland, Indiana

EXPERIENCE

Associate Professor, Department of Biological Sciences, Old Dominion University, July 2013-present
Honorary Associate Professor, School of Mathematics, Statistics and Computer Sciences, University of KwaZulu-Natal, July 2013-present
Assistant Professor, Department of Biological Sciences and Virginia Modeling, Analysis and Simulation Center, Old Dominion University, August 2010-July 2013
Assistant Professor, School of Community and Environmental Health and Virginia Modeling, Analysis and Simulation Center, Old Dominion University, August 2007-July 2010
Assistant Professor, Department of Epidemiology and Preventive Medicine, University of Maryland, Baltimore, Maryland, August 2004-July 2007
Research Scientist, Dynamics Technology, Inc., Arlington, Virginia, April 2003-July 2004
Postdoctoral Research Associate, The Institute for Environmental Modeling, University of Tennessee, Knoxville, February 2002-April 2003
Application Consultant, Onward, Inc., Mountain View, California, April 2001-January 2002
Postdoctoral Fellow, Division of Ecosystem Sciences, ESPM, University of California, Berkeley, March 2000-March 2001
Postdoctoral Fellow, Department of Medicine, University of California, San Francisco, August 1999-March 2000
Graduate Research Assistant, The Institute for Environmental Modeling, University of Tennessee, Knoxville, September 1993-July 1999
Graduate Teaching Associate, Mathematics Department, University of Tennessee, Knoxville, September 1993-May 1997
Lab Instructor, Taylor University, September 1992-May 1993

TEACHING

Old Dominion University

Advanced Statistics, BIOL 795/895, Spring 2018
 Modeling and Simulation in Life Sciences, BIOL 772/872, Spring 2011, Spring 2013, Spring 2017
 Infectious Disease Epidemiology (Writing intensive), BIOL 436/536, Fall 2013, Fall 2014, Fall 2015, Spring 2016, Fall 2016, Fall 2017
 GIS in Life Sciences, BIOL 732/832, Spring 2012, Spring 2014
 Ecology Seminar: Hello World: Programming Basics for Biologists, BIOL 708/808, Spring 2013
 Ecology Seminar: Foundations of Disease Ecology, BIOL 702/708/802/808, Fall 2012
 Epidemiology, BIOL 496/596, Fall 2011
 Vector-borne Diseases, BIOL 795/895, Co-taught with Hynes, Fall 2011
 GIS in Health Sciences, HLSC 795/895, Spring 2010
 PhD Colloquium, HLSC 889, Fall 2009, Spring 2010, Fall 2011
 Advanced Epidemiology, HLSC 846, Fall 2009, Fall 2011
 Modeling and Simulation in Health Sciences, HLSC 795/895, Spring 2009
 Epidemiology, CHP 646/MPHO 814, Two sections – one live, one internet/asynchronous, Spring 2009, Two sections – one live, one TELETECHNET, Spring 2008

University of KwaZulu-Natal

Mathematical Biology, MATH731, Spring 2015

University of Tennessee, Knoxville

Calculus for Life Sciences II, Math 152, Fall 1998
 Algebraic Reasoning, Math 110, Spring 1996
 Calculus for Life Sciences I, Math 151, Spring 1995
 Business Calculus, Math 121, Spring 1994
 College Algebra, Math 119, Fall 1993

Completed Graduate Students at Old Dominion University as Advisor

- Jacqueline Jackson, PhD Health Services Research – cognate M&S, 2010
 Current Position: US Coast Guard Analyst
- Mohammad Alzahrani, PhD Health Services Research – cognate M&S, 2011
 Current Position: Faculty member at Prince Sultan College of Health Sciences, Dhahran, Saudi Arabia
- Grace Schulte, MS Biology, 2012
 Current Position: Instructor, Tidewater Community College
- Pamela Kelman, MS Biology, 2014
 Current Position: Norfolk Public Health
- Koren Goodman, PhD Health Services Research, Cognate M&S, 2014
 Current Position: Clinical Research Coordinator, Barnabas Health
- Greg Scott, PhD Health Services Research, Cognate M&S, 2014
 Current Position: Healthcare Management Program Director, South University
- Lydia Wigglesworth, PhD Health Services Research, Cognate M&S, 2015
- Lindsey Bidder, MS Biology 2016
 Current Position: Water Quality Supervising Specialist, Hampton Roads Sanitation District
- Robyn Nadolny, PhD Ecological Sciences, 2016
 Current Position: Biologist, Tick-Borne Disease Laboratory, US Army Public Health Center
- Allyn Bryan, MS Biology 2017

Completed Graduate Students at Old Dominion University as Committee Member

- PhD Biomedical Sciences Committee Member:

- Chelsea Wright (2015)
- PhD Ecological Sciences Committee Member:
Jack Butler (2016), Lester Gittons (2017)
- PhD Applied and Computational Mathematics Committee Member,
Caleb Adams (2011), Shu Liao (2010)
- MS Biology (Non-thesis) Committee Member,
Amber Blue (2012)
- MS Biology (Thesis) Committee Member,
John Tiggelaar (2012), Jonathan Schmude (2013), Mia Comeros (2014), Sharon Vaturi (2015), Erin Heller (2015), Christi Linardich (2016), Jack Buchanan (2016), Kristin Phillips (2016)
- PhD Computer Science Committee Member,
Samiur Arif (2014)
- PhD Health Services Research Committee Member,
Kurt Heisler (2014), Ruicui Liu (2016)
- PhD Psychology Committee Member,
Jessica Ladage (2015), Valerie Streets (2016)
- PhD English Committee Member,
Laura Paganucci (2016)

Current Graduate Students at Old Dominion University as Advisor

- Chair, PhD Ecological Sciences
Alexis White
Title: Mechanical versus biological control of ticks
Date: 2013-present
- Chair, PhD Ecological Sciences
Sara Simmons
Date: 2017-present
- Chair, PhD Ecological Sciences
Harmony Hancock
Date: 2017-present
- Chair, PhD Health Services Research, Cognate Epidemiology
Patti Kiger
Title: The Role of Stepfathers in Child Health
Date: 2009-present

Current Graduate Students at Old Dominion University as Committee Member

- Committee Member, PhD Ecological Sciences
Spencer Schubert, Natasha Hagemeyer, Gaya Gnanalingam, Nicholas Flanders
- Committee Member, PhD Biomedical Sciences
Alexandra Cumbie
- Committee Member, PhD Health Services Research
Khyati Kantaria
- Committee Member, MS Biology
J. Andrew Arnold, Amanda Pomposini, Ashley Morris, Laura Bitzer

MPH practicum students at Old Dominion University

- Anubha Mishra, Fall 2008
- Karen Sussman, Spring 2013
- Melissa Stevenson, Fall 2013
- Pamela Kelman, Fall 2015

- Jason McCain, Spring 2017
- Jill Riehl, Spring 2018
- Christina Espada, Spring 2018

Undergraduate Students at Old Dominion University

- Matthew Benz, Summer internship 2009 (Current position: State Health Department)
- Joy Boyles, Summer research 2009 (Current position: Unknown)
- Brandon Rowan, Summer research 2010 (Current position: ODU Graduate student)
- Ryan Wright, Summer internship 2010 (Current position: Virginia Beach Health Department)
- Diana Lewis, Summer research 2011 (Current position: Virginia Tech Vet School)
- Nicole Cox, Summer research 2011 (Current position: Undergraduate research with Sonenshine)
- Lauren Jarlenski, Summer research 2011
- Daniel Drake, RUMS, Summer 2011
- Alex Pullman, RUMS, Summer 2011
- Mindy Marshall, RUMS, Summer 2011
- Breanna White, RUMS, Summer 2011
- Brittany St. Jacques, RUMS, Summer 2011 (Current position: W&M Graduate student)
- Ashley Moye, RUMS, Summer 2011 (Current position: Virginia Tech veterinary student)
- Eleanor Squires, Research volunteer 2012
- Sara Blachman, Research volunteer 2012
- Stefanie Snyder, Research volunteer 2012
- Amy Johnson, RUMS, Summer 2012-present
- Joseph Brown, RUMS, Summer 2012-present
- John Warfle, RUMS, Summer 2012
- Caitlin Sciuti, RUMS, Summer 2012
- David Cutherell, RUMS, Summer 2012-Summer 2013
- Yong Suk Ko, RUMS, Summer 2012
- Alexis White (from Unity College), Summer internship 2012
- James Lana, Internship, Summer 2012
- Ashley Morris, Lab rotation, Summer 2012
- Apinder Kaur, Undergraduate Research, Fall 2012
- Brittany Kolodziejczyk, Undergraduate Research, Summer 2013
- Kyle Leas, Environmental Health Internship, Summer 2013
- Ryan Hart, RUMS, Summer 2013
- Nikeya Melton, RUMS, Summer 2013
- Jessica Vincent, RUMS, Summer 2013
- Michael Bailey, Undergraduate Research, Spring 2014
- Carter Watson, Honors Undergraduate Research, Spring 2014-2015
- Dorothy Paine, RUMS Summer 2014
- Anja Nilsson, Undergraduate Research, 2014-2015
- Tyler Chavers, Undergraduate Research, 2014-2015
- Toan Tran, Spring 2015
- Duke Kunzler, Environmental Health Internship, Summer 2015
- Brittany Krejcar, Environmental Health Internship, Summer 2015
- Kristine Asmussen, Environmental Health Internship, Fall 2015
- Cameron Lenahan, RUMS, 2014-2016
- Leo Notto, RUMS, 2014-2016
- Jonathan Malush, Undergraduate Research, 2014-2015
- Adam Gold, Undergraduate Research, 2016
- Sean Campbell, Environmental Health Internship, Summer 2016

- Stephen Holmsten, Environmental Health Internship, Summer 2016
- Alexander Suarez, Undergraduate Research, 2016-2017
- Katerina Goffigan, Undergraduate Research, 2016-2017
- Laura Bitzer, Undergraduate Research, 2016-2017
- Armin Bahrani, RUMS 2016-2017
- Kirsten Young, RUMS 2016-2017
- Nina Robichaud, Undergraduate Research, 2017-present
- Caitlin Murphy, Undergraduate Research, Spring 2017
- Kelly Hamilton, Undergraduate Research, Spring 2017
- Linda Carlsen, Environmental Health Internship, Summer 2017
- Angeline Sandor, RUMS, 2016-present
- Andrew Evans, Undergraduate Research, 2016-present
- Chris Russo, Undergraduate Research, 2016-present
- Hannah Cummins, RUMS 2017-present
- Amanada Devleeschower, RUMS 2017-present
- Michelle Bershers, RUMS 2017-present

PUBLICATIONS – Peer-reviewed articles and peer-reviewed book chapters

1. Kelman P, Thompson CW, Hynes W, Bergman C, Lenahan C, Brenner JS, Brenner MG, Goodman B, Borges D, Filak M, **Gaff H.** (2018) *Rickettsia parkeri* infections diagnosed by eschar biopsy, Virginia, USA. *Infection*. To appear.
2. Nadolny, R. M., & **Gaff, H. D.** (2018) Natural history of *Ixodes affinis* in Virginia. *Ticks and Tick-borne Diseases*. 9(1):109-119.
3. Nadolny, R. M., & **Gaff, H. D.** (2018) Natural history of *Amblyomma maculatum* in Virginia. *Ticks and Tick-borne Diseases*. To appear.
4. Maliyoni M, Chirove F, **Gaff HD**, Govinder KS. (2017) A Stochastic Tick-Borne Disease Model: Exploring the Probability of Pathogen Persistence. *Bulletin of Mathematical Biology*. 79(9):1999-2021.
5. Shannon AB, Rucinsky R, **Gaff HD**, Brinkerhoff RJ. (2017) *Borrelia miyamotoi*, Other Vector-Borne Agents in Cat Blood and Ticks in Eastern Maryland. *EcoHealth*. 6:1-5.
6. Butler, J., Butler, M. J., **Gaff, H.** (2017) Snap, crackle, and pop: acoustic-based model estimation of snapping shrimp populations in healthy and degraded hard-bottom habitats. *Ecological Indicators*. To appear.
7. Manore, C.A., Ostfeld, R.S., Agosto, F.B., **Gaff, H.**, LaDeau, S.L. (2017) Defining the Risk of Zika and Chikungunya Virus Transmission in Human Population Centers of the Eastern United States. *PLoS Negl Trop Dis* 11(1): e0005255. doi:10.1371/journal.pntd.0005255
8. Nadolny RM, Gauthier DT, **Gaff HD**, Bermudez SE. Preliminary assessment of the population genetics of *Ixodes affinis* (Ixodida: Ixodidae) in North and Central America. *Systematic and Applied Acarology*. 2016 Aug 24;21(10):1300-8.
9. Springer, Yuri P., et al. (2016) Tick-, mosquito-, and rodent-borne parasite sampling designs for the National Ecological Observatory Network. *Ecosphere* 7.5.
10. Heller, E. L., Wright, C. L., Nadolny, R. M., Hynes, W. L., **Gaff, H. D.**, & Walters, E. L. (2016). New Records of *Ixodes affinis* (Acari: Ixodidae) Parasitizing Avian Hosts in Southeastern Virginia. *Journal of medical entomology*, 53(2), 441-445.
11. Campana, M.G., Hawkins, M.T., Henson, L.H., Stewardson, K., Young, H.S., Card, L.R., Lock, J., Agwanda, B., Brinkerhoff, J., **Gaff, H.D.**, Helgen, K.M. Maldonado, J.E., McShea, W.J., Fleischer, R. C. Simultaneous identification of host, ectoparasite and pathogen DNA via in-solution capture. *Molecular ecology resources*. 2016.
12. Fister, K. R., **Gaff, H.**, Lenhart, S., Numfor, E., Schaefer, E., & Wang, J. (2016). Optimal control of vaccination in an age-structured cholera model. In *Mathematical and Statistical Modeling for Emerging and Re-emerging Infectious Diseases* (pp. 221-248). Springer International Publishing.

13. Walter KS, Pepin KM, Webb CT, **Gaff HD**, Krause PJ, Pitzer VE, Diuk-Wasser MA. Invasion of two tick-borne diseases across New England: harnessing human surveillance data to capture underlying ecological invasion processes. *Proc. R. Soc. B* 2016 283 20160834; DOI: 10.1098/rspb.2016.0834.
14. Nadolny RM, **Gaff H**, Carlsson J, Gauthier D. Comparative landscape genetics of two invading ticks: evidence of the ecological mechanisms underlying tick range expansions. *Infection, Genetics, and Evolution*. 2015. 35: 153-162.
15. Wright CL, Sonenshine DE, **Gaff HD**, & Hynes WL. *Rickettsia parkeri* transmission to *Amblyomma americanum* by cofeeding with *Amblyomma maculatum* (Acari: Ixodidae) and potential for spillover. *Journal of Medical Entomology*. 2015. 52(5):1090-1095.
16. Nadolny RM, Feldman KA, Pagac B, Stromdahl EY, Rutz H, Wee SB, Richards AL, Smith J, Armolt M, **Gaff HD**. Review of the Mid-Atlantic Tick Summit III: A model for regional information sharing. *Ticks Tick Borne Dis*. 2015 Jun;6(4):435-8.
17. Wright CL, **Gaff HD**, Sonenshine DE, Hynes WL. Experimental vertical transmission of *Rickettsia parkeri* in the Gulf Coast tick, *Amblyomma maculatum*. *Ticks Tick Borne Dis*. 2015 Apr 29; 6:568-573.
18. **Gaff, Holly D.**, Alexis White, Kyle Leas, Pamela Kelman, James C. Squire, David L. Livingston, Gerald A. Sullivan, Elizabeth W. Baker, Daniel E. Sonenshine, TickBot: A novel robotic device for controlling tick populations in the natural environment, *Ticks and Tick-borne Diseases*, Volume 6, Issue 2, March 2015, Pages 146-151.
19. Parham, Paul E., Joanna Waldoock, George K. Christophides, Deborah Hemming, Folashade Augusto, Katherine J. Evans, Nina Fefferman, **Holly Gaff**, Abba Gumel, Shannon LaDeau, Suzanne Lenhart, Ronald E. Mickens, Elena N. Naumova, Richard S. Ostfeld, Paul D. Ready, Matthew B. Thomas, Jorge Velasco-Hernandez, Edwin Michael. Review article: Climate, environmental and socio-economic change: weighing up the balance in vector-borne disease transmission. *Phil. Trans. R. Soc. B*: 2015 370 20130551; DOI: 10.1098/rstb.2013.0551. Published 16 February 2015
20. Chitanga, S., **Gaff, H.** and Mukaratirwa, S., 2014, Tick-borne pathogens of potential zoonotic importance in the southern African region, *Journal of the South African Veterinary Association* 85(1), Article #1084, 3 pages. <http://dx.doi.org/10.4102/jsava.v85i1.1084>.
21. Florin DA, Brinkerhoff JR, **Gaff H**, Jiang J, Robbins RG, Eickmeyer W, Butler J, Nielsen D, Wright C, White A, Gimpel ME & Richards AL. (2014) Additional U.S. collections of the Gulf Coast tick, *Amblyomma maculatum* (Acari: Ixodidae), from the State of Delaware, the first reported field collections of adult specimens from the State of Maryland, and data regarding this tick from surveillance of migratory songbirds in Maryland. *Systematic & Applied Acarology* 19(3): 257–262.
22. Roger W Stich, Byron L Blagburn, Dwight D Bowman, Christopher Carpenter, M Roberto Cortinas, Sidney A Ewing, Desmond Foley, Janet E Foley, **Holly Gaff**, Graham J Hickling, R Ryan Lash, Susan E Little, Catherine Lund, Robert Lund, Thomas N Mather, Glen R Needham, William L Nicholson, Julia Sharp, Andrea Varela-Stokes and Dongmei Wang. (2014) Quantitative factors proposed to influence the prevalence of canine tick-borne disease agents in the United States: the launch of Parasites & Vectors. *Parasites & Vectors*, 7:417.
23. Wright CL, **Gaff HD**, & Hynes W.L. Prevalence of *Ehrlichia chaffeensis* and *Ehrlichia ewingii* in *Amblyomma americanum* and *Dermacentor variabilis* collected from southeastern Virginia, 2010–2011. *Ticks and tick-borne diseases*. 2014 5(6): 978-982.
24. Zheng H, **Gaff H**, Smith G, & DeLisle S. (2014). Epidemic Surveillance Using an Electronic Medical Record: An Empiric Approach to Performance Improvement. *PloS one*, 9(7), e100845.
25. Tracy JK, Schluterman NH, Greene C, Sow SO, & **Gaff HD** (2014). Planning for human papillomavirus (HPV) vaccination in sub-Saharan Africa: A modeling-based approach. 2014. *Vaccine*, 32(26), 3316-3322.
26. Gaines DN, Operario DJ, Stroup S, Stromdahl E, Wright C, **Gaff H**, Broyhill J, Smith J, Norris DE, Henning T, Lucas A, Houpt E. (2014) Ehrlichia and Spotted Fever Group Rickettsiae

- Surveillance in *Amblyomma americanum* in Virginia Through Use of a Novel Six-Plex Real-Time PCR Assay. *Vector-Borne and Zoonotic Diseases*. 14(5): 307-316.
27. Brown J, Kelman P, **Gaff H**. Using Pheromones to Enhance Field Tick Collection Techniques. *Letters in Biomathematics*. 2014. Vol 1, No 1.
 28. **Gaff HD**, Kocan KM and Sonenshine DE, Tick-borne Rickettsioses II (Anaplasmataceae), in DE Sonenshine, RM Roe, eds., *Biology of Ticks*, Second Edition (book chapter), 2014.
 29. Wright CL, Hynes WL, White BT, Marshall, MN, **Gaff HD**, Gauthier DT. Single-tube real-time PCR assay for differentiation of *Ixodes affinis* and *Ixodes scapularis*. *Tick and Tick-borne Diseases*. 2014. 5(1):48-52. <http://dx.doi.org/10.1016/j.ttbdis.2013.08.003>
 30. Nadolny, RM, Wright CL, Sonenshine DE, Hynes WL, **Gaff HD**. Ticks and spotted fever group rickettsiae of southeastern Virginia. *Ticks Tick-borne Dis*. 2014. 5(1):53-57. <http://dx.doi.org/10.1016/j.ttbdis.2013.09.001>
 31. Adongo D, Fister KR, **Gaff H**, Hartley D. Optimal control applied to Rift Valley fever. *Natural Resource Modeling*. 2013. Volume 26(3):385-402.
 32. Alonzo J, **Gaff H**, and Watson GS. A Laboratory for Collaboration: Rehearsal Communication Skills for Biologists and Mathematicians. *Biology International*. No. 53(2013).
 33. **Gaff H** and Nadolny R. Identifying requirements for the invasion of a tick species and tick-borne pathogen through TICKSIM. *Mathematical Biosciences and Engineering*. 2013 Jun;10(3):625-35.
 34. Gammack D, Schaefer E, and **Gaff H**. Global dynamics emerging from local interactions: agent-based modeling for the life sciences. In *Mathematical concepts and methods in modern biology : using modern discrete models*. Edited by Raina Robeva, Terrell L. Hodge. Academic Press (Amsterdam). 2013.
 35. Niu T, Hartley DM, Papelis YE, **Gaff HD**, An Epidemiological Model of Rift Valley Fever with Spatial Dynamics. *Computational and Mathematical Methods in Medicine* Volume 2012 (2012), Article ID 138757, 12 pages.
 36. Hartley D, Barker C, Le Menach A, Niu T, **Gaff H**, Reisen W. The effects of temperature on the emergence and seasonality of West Nile virus in California. *American Journal of Tropical Medicine & Hygiene*, (2012) 86(5): 884-894.
 37. Luce-Fedrow A, Wright C, **Gaff HD**, Sonenshine DE, Hynes WL and Richards AL. *In vitro* propagation of *Candidatus Rickettsia andeanae* isolated from *Amblyomma maculatum*. *FEMS Immunol Med Microbiol* (2012), 64: 74–81.
 38. Nadolny R, Wright C, Hynes WL, Sonenshine DE, **Gaff H**. *Ixodes affinis* (Acari: Ixodidae) in southeastern Virginia and implications for the spread of *Borrelia burgdorferi*, the agent of Lyme disease. *Journal of Vector Ecology*, (2011) 36(2):464-467.
 39. **Gaff HD**, Schaefer E and Lenhart S. Use of optimal control models to predict treatment time for managing tick-borne disease. *Journal of Biological Dynamics*, (2011) 5(5):517-530.
 40. Wright CL, Nadolny R, Jiang J, Richards AL, Sonenshine DE, **Gaff HD**, Hynes WL. Tidewater Spotted Fever: Detection of *Rickettsia parkeri* in Gulf Coast ticks, southeastern Virginia. *Emerging Infectious Diseases*, (2011) 17(5): 896-898.
 41. **Gaff H**. Preliminary analysis of an agent-based model for a tick-borne disease. *Mathematical Biosciences and Engineering*, (2011) 8(2): 465–475.
 42. **Gaff H**, Burgess C, Jackson J, Niu T, Papelis Y, Hartley D. Mathematical Model to Assess the Relative Effectiveness of Rift Valley Fever Countermeasures. *International Journal of Artificial Life Research*, (2011) 2(2), 1-18.
 43. Tracy L, **Gaff HD**, Burgess C, Sow S, Gravitt PE, Tracy JK. Estimating the Impact of Human Papillomavirus (HPV) Vaccination on HPV Prevalence and Cervical Cancer Incidence in Mali. *Clinical Infectious Diseases*, (2011) 52 (5): 641-645.
 44. **Gaff H**, Lyons MM, Watson G. Classroom Manipulative to Engage Students in Mathematical Modeling of Disease Spread: 1+1 = Achoo! *Mathematical Modeling of Natural Phenomena*, (2011) 6 (6): 215-226.

45. Mukandavire Z, Liao S, Wang J, **Gaff H**, Smith DL, Morris, Jr., JG. Estimating the reproductive numbers for the 2008-2009 cholera outbreaks in Zimbabwe. *Proceedings of the National Academies of Sciences*, (2011) 108(21): 8767-8772.
46. Alexanderian A, Gobbert MK, Fister KR, **Gaff H**, Lenhart S, Schaefer E. An Age-Structured Model for the Spread of Epidemic Cholera: Analysis and Simulation. *Nonlinear Analysis: Real World Applications*, (2011) 12(6): 3483-3498.
47. Jungck JR, **Gaff HD** and Weisstein A. Mathematical Manipulative Models: In Defense of “Beanbag Biology”. *CBE--Life Sciences Education*, (2010) 9(3): 201-211.
48. Jungck JR, **Gaff HD**, Fagen A, and Labov JB. From the National Academies “Beyond BIO2010: Celebration and Opportunities” at the Intersection of Mathematics and Biology. *CBE--Life Sciences Education*, (2010) 9(3): 143-147.
49. Neilan RLM, Schaefer E, **Gaff H**, Fister KR, Lenhart S. Modeling Optimal Intervention Strategies for Cholera. *Bulletin of Mathematical Biology*, (2010) 72(8): 2004-2018.
50. Lyons MM, Ward JE, **Gaff H**, Hicks R, Drake J, Dobbs FC. Theory of island biogeography on a microscopic scale: organic aggregates as islands for aquatic pathogens. *Aquatic Microbial Ecology*, (2010) 60 (1): 1-13.
51. **Gaff H**, Schaefer E. Optimal control applied to vaccination and treatment strategies for various epidemiological models, *Mathematical Biosciences and Engineering*, (2009) 6:469-492.
52. Duke-Sylvester SM, Perencevich EN, Furuno JP, Real LA and **Gaff H**. Advancing epidemiological science through computational modeling: a review with novel examples, *Annales Zoologici Fennici*, (2008) 45:385-401.
53. **Gaff H** & Schaefer, E. Metapopulation models in tick-borne disease transmission modelling In "Modelling parasitic Disease Transmission: Biology to Control", eds. Michael, E & Spear, R Landes Bioscience / Eurekah: Austin, TX, USA, (2008).
54. **Gaff H**, Gross L and Schaefer E. Results from a mathematical model for human monocytic ehrlichiosis, *Clinical Microbiology and Infection*, (2008) 15 s2: 15-16.
55. **Gaff H** and Gross LJ, Modeling tick-borne disease: a metapopulation analysis, *Bulletin of Mathematical Biology*, (2007) 69: 265-288.
56. **Gaff H**, Joshi HR, and Lenhart S, Optimal harvesting during an invasion of a sublethal plant pathogen, *Environment and Development Economics*, (2007) 12: 673-686.
57. **Gaff H**, Hartley D and Leahy N, An epidemiological model for Rift Valley fever virus, *Electronic Journal of Differential Equations*, (2007) Vol 2007(115): 1-12.
58. Joshi HR, Lenhart S, Lou H, and **Gaff H**, Harvesting Control in an integrodifference population model with concave growth term, *Nonlinear Analysis: Hybrid Systems*, (2007) 1: 417-429.
59. Furuno JP, Harris AD, Wright MO, Hartley DM, McGregor, JC, **Gaff HD**, Hebden JN, Standiford HC, Perencevich EN; Utility of active surveillance culturing for methicillin-resistant *Staphylococcus aureus* upon intensive care unit discharge. *Infection Control and Hospital Epidemiology*, (2007) 28:666-670.
60. Joshi HR, Lenhart S, and **Gaff H**, Optimal harvesting in an integrodifference population model, *Optimal Control Applications and Methods* (2006) 27:61-75.
61. **Gaff H**, Chick J, DeAngelis D, Gross L, Trexler J and Salinas R, Evaluation of and insights from ALFISH: a spatially-explicit, landscape-level simulation of fish populations in the Everglades, *Hydrobiologia* (2004) 520(1-3):73-86.
62. **Gaff H**, DeAngelis D, Gross L, Salinas R and Shorosh M, A dynamic landscape model for fish in the Everglades and its application to restoration, *Ecological Modelling* (2000) 127:33-52.

PUBLICATION – Peer-review articles in press

1. Gauthier, DT, Latour, RJ, **Gaff, HD**, Vogelbein, WK, Mycobacteriosis in Chesapeake Bay Striped Bass (*Morone saxatilis*), in Perra, P., Armstrong, M., eds. Northeast Atlantic Coast Striped Bass Fisheries Management (book chapter).

PUBLICATION – Refereed Conference Proceedings and Extended Abstracts

1. White A and Gaff H. Ticky Business Simulation. Proceedings of the 2016 Student Capstone Conference. Suffolk, VA: Virginia Modeling, Analysis and Simulation Center (VMASC).
2. White A, Wright C, Schaefer E, Gaff H. Dynamics of two pathogens in a single tick population. Proceedings of the 2015 Student Capstone Conference. Suffolk, VA: Virginia Modeling, Analysis and Simulation Center (VMASC).
3. White A, Nadolny R and Gaff H, Modeling Effectiveness of Tick Control by a Species that Exhibits Predator-prey Role Reversal. Proceedings of the 2014 Student Capstone Conference. Suffolk, VA: Virginia Modeling, Analysis and Simulation Center (VMASC).
4. Drake Tillinghast D and Gaff H, An Agent-based model of the dynamics of a tick-borne disease, Proceedings of the 2012 Student Capstone Conference. Suffolk, VA: Virginia Modeling, Analysis and Simulation Center (VMASC).
5. Goodman KS, Gaff H, Giles EF, De Leo G, The Application of Interactive Behavior Change Technologies to Enhance Patient Education Among Adults Diagnosed with Diabetes. Extended Abstract. Proceedings of the 2012 Student Capstone Conference. Suffolk, VA: Virginia Modeling, Analysis and Simulation Center (VMASC).
6. Wigglesworth-Ballard LE, Wiles L and Gaff H. Simulation of Infectious Disease Spread in a Clinical Lab Setting: A Pilot Study. Proceedings of the 2012 Student Capstone Conference. Suffolk, VA: Virginia Modeling, Analysis and Simulation Center (VMASC).
7. Eggleston J, Gaff H and Watson GS. Mathematics in a Biological Context: the Use of Modeling, Analysis and Simulation to enhance STEM Education. Proceedings of the 2012 Student Capstone Conference. Suffolk, VA: Virginia Modeling, Analysis and Simulation Center (VMASC).
8. Alzahrani M, Gaff H, Shuman D, Kady R. Using Modeling and Simulation to Improve Oral Health Services Delivery in Norfolk Public Health District Dental Clinic, Little Creek. Extended Abstract. Proceedings of the 2011 Student Capstone Conference. Suffolk, VA: Virginia Modeling, Analysis and Simulation Center (VMASC).
9. Scott GT. Preliminary Modeling Solutions for Prevention of Medicare Insolvency for the Baby Boomer Generation. Proceedings of the 2011 Student Capstone Conference. Suffolk, VA: Virginia Modeling, Analysis and Simulation Center (VMASC). (PhD student)
10. Wigglesworth-Ballard LE. Improving nursing infection control practices in a virtual intensive care unit. Proceedings of the 2011 Student Capstone Conference. Suffolk, VA: Virginia Modeling, Analysis and Simulation Center (VMASC). (PhD student)
11. De Leo G, Goodman K, Radici E, Sechrist S and Mastaglio T. Level of Presence in Team-Building Activities: Gaming Component in Virtual Environments. Proceedings of the 2011 Student Capstone Conference. Suffolk, VA: Virginia Modeling, Analysis and Simulation Center (VMASC). (Presented by Goodman, PhD student)
12. Wigglesworth-Ballard L. Use of polyethylene microspheres to simulate hospital acquired infections: a teaching strategy for healthcare students and workers. Abstract. Proceedings of the 2010 Student Capstone Conference. Suffolk, VA: Virginia Modeling, Analysis and Simulation Center (VMASC). (PhD student)
13. Alzahrani MJ. Using Modeling and Simulation to Improve Oral Health Services Delivery. Abstract. Proceedings of the 2010 Student Capstone Conference. Suffolk, VA: Virginia Modeling, Analysis and Simulation Center (VMASC). (PhD student)
14. Goodman KS. An Analysis of Biosurveillance and Potential threats to Public Health. Abstract. Proceedings of the 2010 Student Capstone Conference. Suffolk, VA: Virginia Modeling, Analysis and Simulation Center (VMASC). (PhD student)
15. Jackson J. The use of Getis and Ord cluster analysis for analyzing rainfall data in relation to Rift Valley fever outbreaks. Abstract. Proceedings of the 2010 Student Capstone Conference. Suffolk, VA: Virginia Modeling, Analysis and Simulation Center (VMASC). (PhD student)

COMMUNITY-ENGAGED SCHOLARSHIP

1. ODU Tick Research Team Facebook Page. www.facebook.com/oduticklab. This page is maintained as an outreach to inform the public of the findings of the lab as well as the progress of the students in the lab.
2. Tick Outreach
 - a. Formal presentation: Wildlife Rehabber Annual Conference, Army Corps of Engineers, Norfolk Command, Virginia Association of Wetlands Professionals, Suffolk VMCA, Newport News Waterworks
 - b. Informal Tick Outreach: Riverfest, Hoffer Creek, Paradise Creek, Norfolk Botanical Gardens, ODU Admitted Students Day
3. Media Coverage
 - a. Milius, Susan. "Ticks are here to stay. But scientists are finding ways to outsmart them", Science News. Vol. 192 No. 2, August 19, 2017, p. 16.
 - b. Rife, Luanne. "Lyme disease continues to rise in New River Valley", The Roanoke Times, July 31, 2017.
 - c. Knepler, Michael. "Students, professors team up to discover what's ticking", ODU Monarch Magazine, Fall 2016.
 - d. Hamilton, Sherry. "It's also tick season: ODU professor is in Mathews studying the little pests", Gloucester-Mathews Gazette-Journal, June 15, 2016.
 - e. Hubbard, Frances. "Tick collection moves to new spot in Mathews", Daily Press, June 14, 2016.
 - f. English, Linda Lamm. "ODU researchers want that tick you picked up", The Virginian-Pilot, December 27, 2015.
 - g. Middleton, Leslie. "VA seeing more ticks as species from North, South expand their range". Bay Journal, June 8, 2015.
 - h. Chen, Eli. "The Lone Star Tick", iSeeChange, Delaware Public Media interview, October 30, 2015.
 - i. McConnell, Sarah, "VMI TickBot", With Good Reason, Virginia Public Radio interview, Jul 14, 2014.
 - j. Harper, Scott, "Ick! Beware of Hampton Roads' latest tick," Virginian Pilot, May 12, 2011.
 - k. WAVY-10, "New ticks in Hampton Roads," May 12, 2011.
http://www.wavy.com/dpp/news/local_news/new-ticks-in-hampton-roads
 - l. WVEC-3, "Gulf Coast ticks apparently on the rise in Hampton Roads," May 12, 2011.
<http://www.wvec.com/home/Gulf-Coast-ticks-apparently-on-the-rise-in-Hampton-Roads-121735979.html>
 - m. Russell, Lia, "ODU Helps New Park Zero In On Blood Suckers," Virginian Pilot, February 14, 2010.
4. Salary Equity Study ad hoc Committee. "Population Analysis of Salary Equity at Old Dominion University." August 2015. This study was completed at the request of ODU President John Broderick. Holly Gaff did the analysis with input from the rest of the committee. The reports was disseminated to the entire campus body, and the key findings were that the long history of commitment to salary equity at ODU indicates that there is no statistically significant difference in pay along gender or racial lines.
5. Alonzo, Jenifer and **Holly Gaff**. Creator/Facilitator. "Let's Talk Research" Workshops. These applied-theatre laboratories were developed for scientists and mathematicians as pilot data for our larger research project studying how applied theatre might help scientists and mathematicians better collaborate. Pre- and post- laboratory surveys were collected and are currently being evaluated by Dr. Ginger Watson (Education). Other evaluations include letters of support for a submitted NSF grant and are available upon request.
 - a. "Let's Talk Research: Learning to Communicate in Collaboration," Murray State University, Murray, KY, March 12-13, 2010.

- b. "Let's Talk Research: Learning to Communicate in Collaboration," Marymount University, Arlington VA, June 3-4, 2010.
 - c. "Let's Talk Research: Learning to Communicate in Collaboration," State University of New York - Geneseo, Geneseo, NY, June 10-11, 2010.
6. Alonzo, Jenifer and **Holly Gaff**. Creator/Facilitator. *Interdisciplinary Communication Laboratory for Undergraduate Biology (iCLUB)*. Using pilot data from above workshops, iCLUB was funded by National Science Foundation as an RCN Incubator (DBI-1061935). Surveys are collected for all workshops, and evaluations are available upon request.
 - a. Centenary College, Shreveport, LA. October 14-16, 2011.
 - b. Cultivating Ensembles in STEM Education and Research (CeSTEMer) Meeting. *i(CLUB) : Learning to Communicate in Collaboration*. Center for Cell Analysis and Modeling, Farmington, CT. 4-6 January 2012.
 - c. National Institute for Mathematical and Biological Synthesis (NIMBioS). *Investigative Workshop: Communication in Collaboration: Leading Collaborative Groups*. July 29-30, 2012.
7. Continuing education materials developed based on article for dentists, dental hygienists and dental assistants.
 - a. McCombs, G. B. and H. Gaff. The Dangers of Tickborne Diseases. *Dimensions of Dental Hygiene*. February 2015;13(2):69–72.
 - b. Dryden, M., Gaff, H., McCombs, G. Pietzsch, M. The dangers of tick-borne diseases: considerations for dental professions. *Dental Hygiene and Technology*. October 2015: 26-29.

TECHNICAL REPORTS

1. **Gaff, H**, Leahy N, and Hartley D, Initial methods for baseline estimates risk of global translocation of diseases, 2006.
2. Hartley DM, **Gaff H**, Wilson J, Huang A, and Walters R, Infectious Disease Threat Detection: Public Health Tools for the 21st Century, 2006.
3. Thomas, DM, Desch A and **Gaff H**, Estimating Disease Risk in the Absence of Incidence Data ESRI Professional Papers, 2004.
4. **Gaff H**, Thomas M, Desch A, and Davis J, Malaria Risk Model Report, IDRAM project, submitted to Armed Forces Medical Intelligence Center, June 2004.
5. **Gaff H**, Hartley D, Davis J, and Jordan R, Final Report for Smallpox Project, Submitted to CIA, December 2003.
6. **Gaff, H** and Gross L, Assessment of the Effects of Proposed Water Regimes on the Fish Prey Base for the Wading Birds in South Florida, series of 15 reports submitted to USGS, May 1998-January 1999.

PUBLISHED ABSTRACTS

1. Bergman CJ, Wright CL, Brenner JS, Brenner MG, **Gaff HD**, Goodman BM. *Rickettsia parkeri* – A headache of a diagnosis. American College of Physicians Internal Medicine Meeting, Boston, Massachusetts, May 1, 2015.
2. Wright CL, Nadolny RM, Sonenshine DE, Hynes WL, **Gaff HD**. Detection of *Ehrlichia* and *Anaplasma* DNA from Ticks in Southeastern Virginia: Current Challenges and Opportunities. American Society of Rickettsiology Annual Meeting, Portland, Maine, June 15-18, 2013.
3. Wright CL, Nadolny RM, Sonenshine DE, Hynes WL, **Gaff HD**, Spatial and Temporal Dynamics of *Ehrlichia chaffeensis* infected ticks in Southeastern Virginia, American Society of Rickettsiology Annual Meeting, Park City, Utah, July 28-31, 2012.
4. Al Zahrani M, Shuman D, Kady RA, **Gaff HD**, Using Modeling and Simulation to Improve Oral Health Delivery in Hampton Roads, VA, APHA Annual Meeting, San Francisco, California, October 27-31, 2012.

5. Al Zahrani M, Shuman D, Kady RA, **Gaff HD**, Using Modeling and Simulation to Improve Oral Health Delivery in Hampton Roads, VA, ADOHTA International Conference, Canberra, Australia, August 16-18, 2012.
6. **Gaff H**. “Results from tick survey in Southeastern Virginia, USA, and application to mathematical modeling,” 6th International Meeting on Rickettsiae and Rickettsial diseases, Heraklion, Greece, June 5-7, 2011.
7. Wright CL, Nadolny R, Jiang J, Richards AL, Sonenshine DE, **Gaff HD**, Hynes WL. “Tidewater spotted fever: Detection of *Rickettsia parkeri* in Gulf Coast ticks, southeastern Virginia,” 6th International Meeting on Rickettsiae and Rickettsial diseases, Heraklion, Greece, June 5-7, 2011.
8. **Gaff H**, Burgess C, Schaefer E, Sonenshine D. “Preliminary Report: An individual-based model of tick-borne disease”, American Society for Rickettsiology Annual Meeting, Hilton Head, South Carolina, August 15-18, 2009.
9. DeLisle S, Tian F, Sun P, South BR, Smith G, **Gaff H**, Samore M, Perl TM, Automated Surveillance To Detect An Influenza Epidemic: Which Respiratory Syndrome Should We Monitor? *Advances in Disease Surveillance*. 5: 21 (2008).
10. DeLisle S, Tian F, Zheng H, Sun P, South BR, **Gaff H**, Samore M, Perl TM, Using Biosurveillance Whole-System Facsimiles To Compare Aberrancy - Detection Methods: Should BioSense Use SatScan? *Advances in Disease Surveillance*. 5:23 (2008).
11. **Gaff H**, Gross L and Schaefer E. Results from a metapopulation model for Human Monocytic Ehrlichiosis (HME). Fifth International Conference on Rickettsiae and Rickettsial Diseases. Marseille, France, May 18-20, 2008.
12. Perencevich EN, Furuno JP, Bradham DD, Hartley DM, Harris AD, **Gaff H**. Clinical and Economic Impact of Several Active Surveillance (AS) Strategies, Including Rapid PCR Testing, for Methicillin Resistant *Staphylococcus aureus* (MRSA) Control in Intensive Care Units (ICU). 18th Annual Scientific meeting of the Society for Healthcare Epidemiology of America. April 2008. Orlando, FL.
13. Tracy JK, Burgess C, Perencevich EN, Salinas RA, **Gaff HD**. Estimating the Impact of a Prophylactic HPV Vaccine on Cervical Cancer Incidence: A Developing Country Model, 29th Annual Meeting of the Society for Medical Decision Making, October 2007. Pittsburgh, Pennsylvania.
14. Perencevich EN, Hartley DM, Furuno JP, Bradham DD, **Gaff H**. Projected costs and benefits of several active surveillance (AS) strategies for methicillin resistant *Staphylococcus aureus* (MRSA) control in intensive care units (ICU), ICAAC, Washington, DC, December 2005.
15. Furuno JP, Hartley DM, **Gaff HD**, Wright MO, Harris AD, Hebden JN, Standiford HC, Perencevich EN. Importance of obtaining active surveillance cultures for methicillin-resistant *Staphylococcus aureus* (MRSA) upon intensive care unit (ICU) discharge. ICAAC, Washington, DC, December 2005.

RESEARCH PAPERS PRESENTED AT PROFESSIONAL MEETINGS (* Invited)

1. * Invited Speaker, “Control of ticks through the use of a tick-killing robot”, International Congress on Entomology, Orlando, Florida, September 25-30, 2016.
2. * Invited Speaker, “Tick-borne disease models”, Analysis and Differential Equation Meeting, Salt Rock, Durban, South Africa, July 12-15, 2015.
3. * Invited Speaker, “Modeling tick-borne disease”, Joint workshop on stochastic epidemic modelling and pseudo spectral solutions of PDEs, Pietermaritzburg, South Africa, July 6-10, 2015.
4. Speaker, “Modeling tick control through the use of a tick-killing robot”, UNISA-UP Workshop on Theoretical and Mathematical Epidemiology, Pretoria, South Africa, March 2-7, 2015.
5. * Invited Speaker, “Tactile: Manipulatives engage students in building causal mathematical models of biological phenomena”, Biomathematics and Ecology: Education and Research, Harvey Mudd College, October 10-12, 2014.
6. * Invited Speaker, “Modeling tick control through use of a tick-killing robot”, AMS-Southeastern Spring Sectional Meeting, March 21-23, 2014.

7. Speaker, "The potential for tick control through the use of a tick-killing robot", Virginia Mosquito Control Meeting, Virginia Beach, Virginia, February 12-14, 2014.
8. * Invited Speaker, "Invading Virginia: a comparison of the invasion patterns of *Ixodes affinis* and *Amblyomma maculatum*", Entomological Society of America Annual Meeting, Austin, Texas, November 10-13, 2013.
9. * Invited Minisymposium Speaker, "Modeling tick control through the use of a tick-killing robot", Biomathematics and Ecology: Education and Research, Marymount University, October 11-12, 2013.
10. * Invited Minisymposium Speaker, "Effect of host abundance on tick-borne pathogens", Society for Mathematical Biology Annual Meeting, Tempe, Arizona, June 9-13, 2013.
11. * Invited Speaker, "Prevention of Tick Borne Disease with Integrated Pest Management (IPM)", Maryland Association for Environmental & Outdoor Education Annual Meeting, Ocean City, Maryland, February 8, 2013.
12. * Invited Plenary Speaker, "Impact of migration patterns on tick-borne disease expansion," Illinois Section of the Mathematics Association of America, Normal, Illinois, March 29-31, 2012.
13. * Invited Speaker, "Estimating tick-borne disease risk using modeling and surveillance", International Conference on Mathematical and Theoretical Biology, Pune, India, January 23-27, 2012.
14. * Invited Speaker, "Dynamics of tick-borne diseases during tick home range expansion", Mathematical Methods In Systems Biology And Population Dynamics, Aims Muizenberg Cape Town, South Africa, January 4-7, 2012
15. * Invited Plenary Speaker, "Estimating tick-borne disease risk through surveillance and modeling", International Symposium on Biomathematics and Ecology: Education and Research (BEER-2011), University of Portland, December 17-18, 2011.
16. Speaker, "Estimating tick-borne disease risk through surveillance and modeling", AWM 40th Anniversary Conference, Brown University, September 17-18, 2011.
17. * Invited Speaker, "Agent-based models of interacting populations," 8th European Conference on Mathematical and Theoretical Biology, and Annual Meeting of The Society for Mathematical Biology, Kraków, June 28 - July 2, 2011.
18. Speaker, "Overview: Reports from US - African BioMathematics Initiative: Conservation Biology," 8th European Conference on Mathematical and Theoretical Biology, and Annual Meeting of The Society for Mathematical Biology, Kraków, June 28 - July 2, 2011.
19. Poster, "Results from tick survey in Southeastern Virginia, USA , and application to mathematical modeling," 6th International Meeting on Rickettsiae and Rickettsial diseases, Heraklion, Greece, June 5-7, 2011.
20. Speaker, "Survey of Ticks in the Hampton Roads area: Mathematical Modeling," 2010 Virginia Mosquito Control Board Association Annual Meeting, Virginia Beach, February 2-4, 2011.
21. Poster, "A hybrid agent-based, differential equation model to assess the impact of livestock movement on a potential Rift Valley fever epidemic," DTRA 2010 Chemical and Biological Defense Science and Technology Conference, Orlando, Florida, November 15-18, 2010.
22. * Invited Speaker, "Estimating tick-borne disease risk with an agent-based model," AMS Fall 2010 Southeastern Sectional Meeting, University of Richmond, November 6-7, 2010.
23. * Invited speaker, "Mathematical modeling of the control of a tick-borne disease," SIAM-LS10, Pittsburgh, Pennsylvania, July 12-15, 2010.
24. Speaker, "An initial mathematical model of the eco-epidemiology of mycobacteriosis in striped bass", USGS Workshop on Fish Health, Populations and Landscape Conservation, Leetown, West Virginia, May 19-20, 2010.
25. * Invited speaker, "Modeling spread of Tick-borne Disease", Mathematical Methods in Systems Biology, Tel Aviv University, Israel, January 5, 2010.

26. * Invited panel member, “Graduate School Opportunities”, NIMBioS Undergraduate Math Biology Conference, University of Tennessee, Knoxville, October 24, 2009.
27. * Invited speaker, “Optimal control of a tick-borne disease model”, The Second International Conference on Mathematical Modeling and Analysis of Populations in Biological Systems, University of Alabama, Huntsville, October 9, 2009.
28. Poster, “Preliminary Report: An individual-based model of tick-borne disease”, American Society for Rickettsiology Annual Meeting, Hilton Head, South Carolina, August 15-18, 2009.
29. * Invited minisymposium speaker, “Effects of migration on tick-borne disease risk”, Annual meeting of the Society for Mathematical Biology, Vancouver, British Columbia, July 27-30, 2009.
30. * Invited speaker, “Teaching the biology and ecology of infectious disease through mathematics”, BIOED 2009, Christchurch, New Zealand, February 2009.
31. * Invited talk, “Metapopulation models in tick-borne disease transmission modeling”, co-author Elsa Schaefer, SIAM Minisymposium on Mathematical Modeling of Natural Resources, Joint Mathematics Meetings, Washington, D.C., January 2009.
32. * Invited minisymposium speaker, “Optimal control of a metapopulation tick model”, Society for Mathematical Biology Annual Meeting, Toronto, Canada, July 30-August 2, 2008.
33. * Invited Plenary Speaker, “Ticks, Mosquitoes, Diseases and Mathematics”, Mathematics Association of America, Northeastern Section Spring 2008 Meeting, St. Michael’s College, Vermont.
34. * Invited Speaker, “Modeling the emergence and transmission of Rift Valley fever”, 42nd Annual US-Japan Cooperative Medical Sciences Program in Virology Global Warming, the Environment, and the Emergence of Viral Diseases Satellite Symposium, Nagasaki, Japan, May 24-28, 2008.
35. Poster, “Results from a metapopulation model for Human Monocytic Ehrlichiosis (HME)”, 5th ESCAR/ASR International Meeting on Rickettsiae and Rickettsial Disease, Marseille, France, May 18-20 2008.
36. * Invited Panel Member, “TIMBER - The Institute for Mathematical Biology Education and Resources”, Appalachian State University, November 2007.
37. * Invited Mini-symposium, “Modeling tick-borne diseases: a metapopulation model”, Joint Annual Meetings of the Society for Mathematical Biology and the Japanese Society for Mathematical Biology, San Jose, August 2007.
38. * Invited Short Course Lecturer, Implementing Biology across the Mathematics Curriculum, MathFest, San Jose, 2007.
39. * Invited Mini-symposium, “Making Models Useful to Decision-Makers”, Joint Mathematics Meetings, New Orleans, January 2007.
40. Talk, “Optimal harvesting during an invasion of a sublethal plant pathogen”, Joint Mathematics Meeting, San Antonio, January 2006.
41. * Invited Panel Member, “From Graduate School to a Tenure-Track Faculty Position Via the Scenic Route”, Association for Women in Mathematics Workshop: Career Transitions, SIAM Annual Meeting, July 2005.
42. Talk, “Optimal Control of a Simplified Tick-borne Disease Model”, Mini-symposium: The Modeling of Disease Using Optimal Control, SIAM Annual Meeting, July 2005.
43. * Invited Talk, “A Tick-Borne Disease Model - Spread and Control of Ehrlichiosis”, Biomathematics in the Commonwealth Workshop, Murray State University, June 2005.
44. Talk, “A Tick-Borne Disease Model”, Workshop on Infectious Disease: Theoretical, Ecological and Economic Approach, Trieste, Italy, April 2005.
45. * Invited Talk, “A Tick-Borne Disease Model - Spread and Control of Ehrlichiosis”, MD-DC-VA Section of the Mathematics Association of America Fall Meeting, November 2004.
46. Poster, “Spatial Spread and Transmission Dynamics of Smallpox”, 2004 ASM Biodefense Research Meeting, March 2004.

47. Talk, "Impacts of Spatial Heterogeneity on Plague", Women of Applied Mathematics: Research and Leadership Conference, University of Maryland, October 2003.
48. Talk, "Numerical results of optimal control applied to an integro-difference model with applications to biology", AMS-MAA Joint Mathematics Meetings, Baltimore, January 2003.
49. Poster, "The effect of spatial heterogeneity on the spread and control of a tick-borne disease", Entomological Society of America Annual Meeting, Las Vegas, November 1998.
50. * Invited Poster, "The effect of spatial heterogeneity on a tick-borne disease", Society for Industrial and Applied Mathematics Meeting, Toronto, July 1998.
51. Poster, "Across Landscape Model for Fish Densities in The Everglades of South Florida: Aiding Restoration Planning", American Society for Limnology and Oceanography Meeting, St. Louis, June 1998.
52. * Invited Panel Member, Session on Environmental Mathematics, American Mathematics Society Meeting, Baltimore, January 1998.

GRANTS AWARDED

Current Grants

1. Principal Investigator, NIH 1R01AI136035-01, "Spatial Eco-epidemiology of Tick-Borne Rickettsial Pathogens", \$2,455,904, 8/18/17-7/31/22.
2. Principal Investigator, USDA, "Adapting TickBot Technology to Support Efforts by Appropriated Cattle Fever Tick Eradication Research Project", \$20,000, 4/1/16-3/31/17.
3. Principal Investigator, CDC, "LYMESIM Software and Support Services", \$135,000, 9/6/16-9/5/17.
4. Co-investigator (PI: Brinkerhoff, University of Richmond), Jeffress Grant, Quantitative genomic analysis of black-legged tick populations in VA to identify processes associated with increased Lyme disease incidence, \$23,420, 6/30/17-6/29/18.

Completed Grants

1. Principal Investigator, University of KwaZulu-Natal, "Building Mathematical Biology at UKZN", \$26,648, 5/1/2015-8/31/2015
2. Principal Investigator, The Henry M. Jackson Foundation for the Advancement of Military Medicine, Inc., "Tidewater Spotted Fever Surveillance in the Hampton Roads Region", \$90,000, 8/4/2011-5/31/2015
3. Principal Investigator, NSF DBI-1061935, RCN UBE-Incubator: Interdisciplinary Communication Laboratory for Undergraduate Biology (iCLUB), \$50,000, 5/1/11-9/30/2013
4. Principal Investigator, Math Ecology LLC Subaward, Dengue Fever Modeling and Analysis, \$13,475, 10/1/2012-9/30/2013
5. Principal Investigator, James Squire, Tick Robot Experimental Design, \$4000, 6/1/2013-5/31/2014
6. Principal Investigator, NIH K25 Award KAI067791A, Spatially-explicit mathematical model of human monocytic ehrlichiosis, 06/01/07 - 05/31/12, \$452,223
7. Investigator, NSF DMS-0813563/DMS-0813691, "RUI: Collaborative Research: Optimal Control Investigator for Cholera Outbreaks" K. R. Fister (PI), \$200,000, 09/01/08-08/31/12
8. Consultant, Old Dominion University Office of Research, "Do Marine Aggregates Facilitate Gene Transfer of Antibiotic Resistance in Nature?" F. Dobbs (PI), 01/01/09-06/30/10, \$81,782
9. Co-Principal Investigator, Old Dominion University Office of Research, "Modeling Eco-Epidemiology of Chronic Disease in Wild Finfish" D. Gauthier (PI), \$74,250. 01/01/10-06/30/10.
10. Principal Investigator, DHS through Georgetown University, "Rift Valley fever modeling and analysis" Hartley (PI), \$80,000, 04/01/10-09/30/10.
11. Principal Investigator, DHS Award FAZD Center, Impact of Climate on the Introduction of a Zoonotic Disease in the United States: A Focus on Rift Valley Fever, 07/01/10-06/30/11, \$91,000

12. Co-Investigator, Johns Hopkins University/CDC, T. Perl (PI), Bring Value Through BioSense - a Performance Based Approach, \$55,000, 10/01/06-09/30/09
13. Principal Investigator, Baltimore VA Research and Education Foundation, Disease-Course Surveillance, \$15,000, 02/01/08-12/31/08
14. Principal Investigator, Old Dominion University Office of Research & Baltimore Research and Education Foundation, Investigation of Instruction and Learning in a Virtual Intensive Care Unit, \$37,300, 06/06/08 – 12/31/08
15. Co-Investigator, Georgetown University Argus Project, D. M. Hartley (PI), \$100,000, 09/01/06-05/31/07
16. Co-Investigator, CDC, A. Harris (PI), New Nosocomial Interventions to Decrease Antimicrobial Resistance \$573,446, 9/30/06 - 05/31/07
17. Co-Investigator, Office of Homeland Security, D. M. Hartley (PI), Modeling of Rift Valley Fever for Agricultural Bioterrorism Defense, \$390,010, 05/01/04-04/30/07

CONSULTING ACTIVITIES

1. EPA and Abt Associates, Bringing LYMESIM into the 21st century, August 2016-September 2017.
2. MBI Working Group Member, From within host dynamics to the epidemiology of infectious disease, April 2014
3. MPE 2013+ Workshop on Global Change Organizer, DIMACS, January 2014-present.
4. NIMBioS Working Group Member, Climate Change and Vector Borne Disease, December 2013-present.
5. University of KwaZulu-Natal *Siyacabanga* Workshop on Complexity and Biology: Tick-borne disease dynamics for wildlife, livestock and humans, March 2013.
6. RAPIDD Workshop on Surveillance Theory, October 2012.
7. Radford University, Mathematical Biology Expert, September 2012.
8. Companion Animal Parasite Council Tick-borne Disease Mapping Factors Working Group Member, June 2012.
9. RAPIDD Underserved Vectors Working Group Member, 2012.
10. Cholera Modeling, SOUTHCOM, 2011.
11. Math Biology Education Subject Matter Expert, Centenary College, 2011.
12. RAPIDD Rift Valley fever/West Nile virus Working Group Member, 2011.
13. Modeling Subject Matter Expert, CDC Cholera Modeling Working Group, 2010.
14. Modeling Subject Matter Expert, Operational Epidemiological Modeling Process Working Group, 2011.
15. Rift Valley fever Subject Matter Expert, U.S. Department of Homeland Security, "Site Specific Biosafety and Biosecurity Mitigation Risk Assessment for the NBAF, Manhattan, KS." December 2009.
16. Modeling Subject Matter Expert, Modeling the Potential Economic Impacts of RVF in the United States Subject Matter Expert Workshop, December 15-17, 2009, Washington, DC.
17. Math and Science Education Expert, NSF, DIMACS, Rutgers University, "BioMath Connection" May 2008 – present.

HONORS, AWARDS AND PRIZES

1. University Women's Caucus Achievement Award, Old Dominion University, April 2017.
2. Distinguished Teaching Award for Outstanding Tenure-Track Teacher, College of Science, Old Dominion University, May 2013.
3. Association for Women in Mathematics, AWM Service Award, January 2013.
4. Old Dominion University Division of Student Affairs, Shining Star Award for Helping students succeed academically, professionally, or personally inside and outside of the classroom setting, January 2010, May 2010, May 2011, December 2015, May 2016, December 2017.

5. University of Tennessee, Knoxville, Graduate Student Academic Achievement Award for Outstanding Academic Performance, Spring 1999.
6. University of Tennessee, Knoxville, Employee Team Excellence Award for Promoting the Spirit of Teamwork, Fall 1998.

MEMBERSHIP IN PROFESSIONAL SOCIETIES

- Society for Mathematical Biology
 - Board of Directors, 2010-2014
 - Webmaster, 2002-2010
 - Newsletter Editor, 2002-present
 - Member, 1996-present
- BIO SIGMAA
 - Chair-Elect, January 2009-December 2009
 - Chair, January 2010-December 2010
 - Past-Chair, January 2011-December 2011
- Association for Women in Mathematics
 - Webmaster, 2003-2012
 - Executive committee member, 2003-2012
 - Member, 1994-present
- Entomological Society of America
 - Member, 1998-present
- American Society for Rickettsiology
 - Member, 2005-present
- Mathematics Association of America
 - Member, 2007-present
- Society for Industrial and Applied Mathematics
 - Member, 1998-present
- AAAS
 - Invited Participant of Vision and Change in Undergraduate Biology Education, July 2009

UNIVERSITY SERVICE

University Level Service

- Member, Graduate Administrators Council, 2016-present
- Member, Search Committee, Director of Faculty Development, 2017
- Member, Search Committee, Director of Diversity and Inclusion, 2017
- Member, SEES Faculty Advisory Committee, 2017-present
- Member, Undergraduate Continuance Committee, 2017-present
- University Women's Caucus, Treasurer (2009-2012), President (2013-2014), Board Member (2009-present)
- Member, Strategic Planning - Economic development and entrepreneurship, Fall 2013
- VMASC Modeling & Simulation Faculty, August 2007-present
- Modeling and Simulation Executive Committee member, 2009-2015
- Faculty co-advisor, SIAM Student Chapter, January 2008-present
- Member, Strategic Planning – Community Engagement Committee, 2009
- Invited seminar, Biology Department and Ocean, Earth and Atmospheric Sciences Department at ODU, January 2008, Mathematics and Statistics Department, November 2007
- University Women's Caucus, Wo-Mentoring Program lead, January 2009-December 2013
- University Women's Caucus, Thriving in the First Year panelist, November 2009
- Member, Modeling and Simulation Steering Committee, September 2009-present

- Faculty advisor and coach, ODU Women's Rugby Club, September 2010-present
- Faculty advisor, Graduate Organization for Modeling and Simulation, October 2011-present

College & Center Level Service

- Member, Medical and Healthcare Sub-Cluster Member, M&S Technology Cluster, VMASC
- Member, CEH Department head search committee, August 2009-April 2010
- Member, Health Services Research PhD Committee, September 2008-July 2010
- Track co-chair, 2008 Student Capstone Conference, VMASC

Departmental Level Service

- Graduate Program Director, PhD in Ecological Sciences, August 2015-present
- Chair, Department Executive Committee, August 2011-2013
- Member, Marine Molecular Ecology Assistant Professor search committee, 2012-2013
- Member, Microbiology/Immunology Assistant and Full professor search committee, October 2010-April 2012
- Member, Environmental Health Assistant professor search committee, October 2009-April 2010
- Member, Health Behavior/Promotion Assistant Professor search committee, October 2009-April 2010
- Member, Assistant Professor search committee, October 2008-April 2009
- Member, Associate Professor search committee, October 2008-March 2009

PROFESSIONAL SERVICE

- Member, Diversity Committee, Math Biosciences Institute, October 2012-present.
- NSF Review Panel, Graduate Research Fellowship Program, 2012: Applied Mathematics Panel, 2013-2015: Ecology Panel.
- Co-Organizer, Annual Meeting for the Virginia Branch of the American Society for Microbiology, November 2012.
- USAID MERC Grant Review Panel, November 2012.
- NIH Review Study Section, NIAID, Microbiology and Infectious Diseases B Subcommittee, Ad hoc member, February 8-9, 2012.
- Invited seminars at UKZN Pietermaritzburg, South Africa, April 29, 2015; UKZN Westville Math, South Africa, April 16, 2015; UKZN Westville Life Sciences, South Africa, April 8, 2015; ARC-Onderstepoort Veterinary Institute, South Africa, March 30, 2015; Cary Institute, Millbrook, NY, September 17, 2014; University of Louisiana, Lafayette, March 13, 2014; University of Delaware, March 5, 2013; SUNY-ESF, December 6, 2012; Franklin and Marshall University, September 18, 2012; Radford University, September 28, 2012; ODU CCPO Colloquium, November 27, 2011; ODU Computer Science Colloquium, February 18, 2011; Longwood University Math Colloquium, February 22, 2011; Emerging Pathogens Institute, University of Florida, Gainesville, October 7, 2009; Academy of Science, Loudoun County High School, Virginia, September 25, 2009; Eastern Virginia Medical School, July 23, 2009; Mathematics Department colloquium, Virginia Commonwealth University, March 20, 2009; Virginia Bioinformatics Institute, Virginia Tech University, November 18, 2008; Truman State University, November 13, 2008; Benedictine University and College of DuPage, October 28-29, 2008; DIMACS, Rutgers University, February 2007; Marymount University, September 2006; Dickinson College, Joint Mathematics-Biology-Computer Science Colloquium, February 2006; Institute for Ecosystems Studies, November 2005; Appalachian State University, March 2005; Appalachian State University, Mathematics Seminar, March 2004; Fogarty International Center, NIH, April 2004; University of Maryland, Baltimore County, February 2004; United States Naval Academy, February 2004; Andrews University, October 2001; Taylor University, September 2000; University of Wisconsin, Lacrosse, December 1999

- Ad hoc reviewer for Emerging Infectious Diseases, American Journal of Tropical Medicine and Hygiene, BMC Medical Research Methodology, EcoHealth, Epidemics, Applicable Analysis, Nonlinear Analysis, Ecological Letters, AMS Notices, Ecological Modelling, Electronic Journal of Differential Equations, Journal of Theoretical Biology, Journal of Biological Dynamics, Notices of the American Mathematical Society, Bulletin of Mathematical Biology, Mathematical Biosciences and Engineering, International Journal of Health Geographics, Medical Decision Making, International Journal of Simulation and Process Modelling, Clinical Infectious Diseases, Ecological Complexities.
- Instructor, DIMACS/MBI Workshop in Quantitative Landscape Ecology and Environmental Sustainability, University of KwaZulu-Natal, Durban, South Africa, July 1-7, 2012
- Curriculum Developer, MPE Sustainable Planet Curriculum Workshop, DIMACS, Rutgers University, October 20-22, 2011
- Instructor, Mathematics Association of America PREP Workshop on Advanced Topics in Math Biology, Sweetbriar College, June 12-18, 2011
- Advanced Study Institute Organizer, DIMACS/MBI US - African BioMathematics Initiative: Workshop and Advanced Study Institute on Conservation Biology Part 2, Kenya, January 10-15, 2011
- Advanced Study Institute Organizer, DIMACS/MBI US - African BioMathematics Initiative: Workshop and Advanced Study Institute on Conservation Biology, South Africa, July 28 - August 10, 2010
- Co-organizer, Beyond BIO2010 Symposium, National Academies of Science, Washington, DC, May 21-22, 2010.
- BioQuest, Workshop leader, BioQuest Workshop, San Juan, Puerto Rico, May 20-22, 2009.
- DIMACS BioMath Connection, Math and Science Education Expert, May 2008-present.
- Integrating Curricula in the Mathematical, Biological, and Environmental Sciences, Workshop Leader, Longwood University, April 2008.
- Collaborative Research at Undergraduate Institutions panel, National Science Foundation, Member, 2003-2006.
- Tufts University Initiative for the Forecasting and Modeling of Infectious Disease, Member, February 2006-2009.
- American Dental Association, Dental Admissions Test Constructor, September 2005-present.
- SIAM Washington-Baltimore Section, Vice-President, January 2005-July 2007.
- Blue Ribbon Panel on Agro-terrorism, White House Office of Science and Technology Policy, Member, December 2003.
- Introduction to the Mathematics of Biological Complexity Short Course, Co-Organizer, University of Tennessee, April 2003.
- Introduction to the Mathematics of Biological Complexity Short Course, Co-Organizer, Society for Mathematical Biology Annual Meeting, July 2002

COMMUNITY SERVICE

- Hoffer Creek Wildlife Foundation, Board of Directors, Member, July 2014-present.
- Lecturer, AWM Sonia Kovalevsky Days, Outreach to encourage girls to study mathematics, Temple University, May 2012
- Commonwealth of Virginia Lyme Disease Task Force Hearing Presentation, April 25, 2011
- Public informational seminar, "H1N1: Is the sky really falling?", Institute for Ethics and Public Affairs, Old Dominion University, November 5, 2009.
- Tick Expert, Hoffer Creek Nature Preserve, Portsmouth, 2010-present
- Tick Expert, Paradise Creek Nature Park, Portsmouth, Elizabeth River Project, 2009-present.
- College/Careers Day, Nueva Esperanza Academy Charter High School, January 2005