

# Katia Koelle - Curriculum vitae

## RESEARCH

### Education:

University of Michigan at Ann Arbor: Ph.D., Ecology and Evolutionary Biology, 2005, <i>Host immunity and climate forcing in cholera dynamics and evolution</i> Dr. Mercedes Pascual, advisor	2001-2005
University of Michigan at Ann Arbor: Certificate in Complex Systems, 2003	2001-2003
Stanford University: B.S., Biological Sciences, 1997	1993-1997

### Professional experience:

Associate Professor, Biology Department, Duke University, Durham, NC	2014-present
Duke Global Health Institute Affiliate, Duke University, Durham, NC	2009-present
Assistant Professor, Biology Department, Duke University, Durham, NC	2007-2014
Post-doctoral Fellow, Center for Infectious Disease Dynamics, The Pennsylvania State University, Dr. Bryan Grenfell, advisor	2006-2007
Research Scientist, Widevine Technologies, Seattle, WA and Ann Arbor, MI	1999-2001
Research Assistant, Department of Microbiology and Immunology, UCSF, CA	1998-1999

### Duke University affiliations/involvement:

Department of Biology, Global Health Institute, Program for Computational Biology and Bioinformatics, University Program in Ecology, Center for Host-Microbial Interactions, Center for Genomics of Microbial Systems (GeMS).

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### Awards, honors, and fellowships:

Recipient of <i>Popular Science's</i> Brilliant 10 award	2014
Recipient of Duke Univ.'s Thomas Langford Lectureship Award	2014-2015

Elected to Faculty of 1000: Theoretical Ecology section	2009
Recipient of the Cozzarelli Prize (This prize is awarded to 6 exceptional papers published in <i>PNAS</i> annually. My collaborator Yoshiro Nagao and I were awarded this prize for our 2008 <i>PNAS</i> paper “Decreases in dengue transmission may act to increase the incidence of dengue hemorrhagic fever”)	2008
Recipient of the Volterra Award for best oral presentation Awarded by the Theory Section of the Ecological Society of America (ESA)	2004
Recipient of the Rackham Outstanding Graduate Student Instructor Award University of Michigan at Ann Arbor, Ann Arbor, MI	2004
Recipient of the E.C. Pielou Award for best oral presentation Awarded by the Statistical Ecology Section of the ESA	2003

**Publications:** (boldface for those published after appointment at Duke; marginal numbers for top ten ranked publications; only published and in press papers listed)

**Koelle, K. and D.A. Rasmussen. Influenza: prediction is worth a shot. (2014) *Nature*. 507 (7490), pp. 47-48. doi:10.1038/nature13054**

**Rasmussen, D.A., Volz, E., and K. Koelle (2014). Phylodynamic inference for structured epidemiological models. *PLoS Computational Biology*. 10(4), p. e1003570. doi: 10.1371/journal.pcbi.1003570**

**Rasmussen, D.A., Boni, M., and K. Koelle (2014). Reconciling phylodynamics with epidemiology: The case of dengue virus in southern Vietnam. *Molecular Biology and Evolution*. 31(2): pp.258-271. doi: 10.1093/molbev/mst203**

**Scholle, S.O., Ypma, R., Lloyd, A.L., and K. Koelle (2013). Viral substitution rate variation can arise from the interplay between within-host and epidemiological dynamics. *The American Naturalist*. 182(4), pp.494-513. doi: 10.1086/672000. (Stacy received Honorable Mention for the 2013 Student Paper of the Year Award from the *American Naturalist* for this paper.)**

**Yuan, H. and K. Koelle (2013). The evolutionary dynamics of receptor binding avidity in influenza A: a mathematical model for a new antigenic drift hypothesis. *Philosophical Transactions of the Royal Society, B*. 368 (1614): p. 20120204. doi: 10.1098/rstb.2012.0204**

**Luo, S. and K. Koelle (2013). Navigating the devious course of evolution: the importance of mechanistic models for identifying eco-evolutionary dynamics in nature. *The American Naturalist*. 181, pp. S58-S75. doi: 10.1086/669952**

**Volz, E.M., Koelle, K., and T. Bedford (2013). Viral phylodynamics. *PLoS Computational Biology*. 9(3): e1002947. doi: 10.1371/journal.pcbi.1002947**

**Wu, S., Koelle, K., and A. Rodrigo (2013). Coalescent entanglement: conditional dependence of the times-to-common-ancestry of mutually exclusive pairs of individuals. *Journal of Heredity*. 104 (1): 86-91. doi: 10.1093/jhered/ess074**

- Ratmann, O., Donker, G., Meijer, A., Fraser, C., and K. Koelle (2012). Phylodynamic inference and model assessment with Approximate Bayesian Computation: influenza as a case study. *PLoS Computational Biology*. 8(12):e1002835. doi: 10.1371/journal.pcbi.1002835
- Luo, S., Reed, M., Mattingly, J., and K. Koelle (2012). The impact of host immune status on the within-host and population dynamics of antigenic immune escape. *Journal of the Royal Society, Interface*. 9 (75), pp. 2603-2613. doi: 10.1098/rsif.2012.0180
- Arinaminpathy, N., Ratmann, O., Koelle, K., Epstein, S.L., Price, G.E., Viboud, C., Miller, M., and B. Grenfell (2012). Impact of cross-protective vaccines on the epidemiological and evolutionary dynamics of influenza. *PNAS*. 109(8), pp. 3173-3177. doi: 10.1073/pnas.1113342109
- WHO-VMI Dengue Vaccine Modeling Group (2012). Assessing the potential of a candidate dengue vaccine with mathematical modeling. *PLoS Neglected Tropical Diseases*. 6(3), e1450. doi: 10.1371/journal.pntd.0001450 (The group consists of 28 experts in dengue epidemiology, clinical practice, immunology, virology, vaccinology, entomology, and mathematical modeling.)
- Koelle, K. and D.A. Rasmussen (2012). Rates of coalescence for common epidemiological models at equilibrium. *Journal of the Royal Society, Interface*. 9(70), pp.997-1007. doi: 10.1098/rsif.2011.0495
- Meyers, L.A., Kerr, B., and K. Koelle (2011). Network Perspectives on Infectious Disease Dynamics. *Interdisciplinary Perspectives on Infectious Diseases*. Volume 2011 (2011), Article ID 146765. doi: 10.1155/2011/146765
- Rasmussen, D.A., Ratmann, O., and K. Koelle (2011). Inference for nonlinear epidemiological models using genealogies and time series. *PLoS Computational Biology*. 7 (8), e1002136. doi: 10.1371/journal.pcbi.1002136
- Koelle, K., Ratmann, O., Rasmussen, D.A., Pasour, V., and J. Mattingly (2011). A dimensionless number for understanding the evolutionary dynamics of antigenically variable RNA viruses. *Proceedings of the Royal Society, Series B*. 278, pp. 3723-3730. doi: 10.1098/rspb.2011.0435
- Koelle, K., Khatri, P., Kamradt, M., and T. Kepler (2010). A two-tiered model for studying the ecological and evolutionary dynamics of rapidly evolving viruses, with an application to influenza. *Journal of the Royal Society, Interface*. 7, pp.1257-1274. doi: 10.1098/rsif.2010.0007
- Koelle, K., Kamradt, M., and M. Pascual (2009). Understanding the dynamics of rapidly evolving pathogens through modeling the tempo of antigenic change: influenza as a case study. *Epidemics*. 1, pp. 129-137. doi: 10.1016/j.epidem.2009.05.003
- Koelle, K (2009). The impact of climate on the disease dynamics of cholera. *Clinical Microbiology and Infection*. 15(s1), pp. 29-31. doi: 10.1111/j.1469-0691.2008.02686.x
- Nagao, Y. and K. Koelle (2008). Decreases in dengue transmission may act to increase the incidence of Dengue Hemorrhagic Fever. *PNAS*. 105(6), pp. 2238-2243. doi: 10.1073/pnas.0709029105
- Cobey, S. and K. Koelle (2008). Capturing escape in infectious disease dynamics. *Trends in Ecology and Evolution*. 23(10), pp.572-577. doi: 10.1016/j.tree.2008.06.008

- Pascual, M., Cazelles, B., Bouma, M., Chaves, L., and K. Koelle (2008). Shifting patterns: malaria dynamics and rainfall variability in an African highland. *Proceedings of the Royal Society, B*. 275. pp.123-132.
- Finkelman, B., Viboud, C., Koelle, K., Ferrari, M., Bharti, N., and B. Grenfell (2007). Global Patterns in Seasonal Activity of Influenza A/H3N2, A/H1N1, and B from 1997 to 2005: Viral Coexistence and Latitudinal Gradients. *PLoS One*. 2(12): e1296.
- Koelle, K., Cobey, S., Grenfell, B. and M. Pascual (2006). Epochal evolution shapes the phylodynamics of interpandemic influenza A (H3N2) in humans. *Science*. 314. pp. 1898-1903.
- Koelle, K., Pascual, M., and M. Yunus (2006). Serotype cycles in cholera dynamics. *Proceedings of the Royal Society, B*. 273. pp. 2879-2886.
- Pascual, M., Koelle, K., and A. Dobson (2006). Hyperinfectivity in Cholera: A New Mechanism for an Old Epidemiological Model? *PLoS Medicine*. 3 (6). p. e280.
- Koelle, K., Rodó, X., Pascual, M., Yunus, M., and G. Mostafa (2005). Refractory periods to climate forcing in cholera dynamics. *Nature*. 436. pp. 696-700.
- Koelle, K., Pascual, M., and M. Yunus (2005). Pathogen adaptation to seasonal forcing and climate change. *Proceedings of the Royal Society, B*. 272. pp. 971-977.
- Koelle, K. and J. Vandermeer (2005). Dispersal-induced desynchronization: from metapopulations to metacommunities. *Ecology Letters*. 8(2). pp. 167-175.
- Buckee, C., Koelle, K., Mustard, M., and S. Gupta (2004). The effects of host contact network structure on pathogen diversity and strain structure. *PNAS*. 101(29). pp.10839-10844.
- Koelle, K. and M. Pascual (2004). Disentangling extrinsic from intrinsic factors in disease dynamics: a nonlinear time series approach with an application to cholera. *The American Naturalist* 163(6), pp.901-913.
- Savit, R., Koelle, K., Treynor, W., and R. Gonzalez (2004). Man and Superman: Human Limitations, Innovation, and Emergence in Resource Competition in *Collectives and the Design of Complex Systems*, eds. Tumer, K. & Wolpert, D. (Springer-Verlag, New York, NY).
- Blower, S.M., Koelle, K., and J. Mills (2002). Health policy modeling: epidemic control, HIV vaccines and risky behavior in *Quantitative Evaluation of HIV Prevention Programs*, eds. Kaplan, E. H. & Brookmeyer, R. (Yale University Press, New Haven, CT).
- Blower, S.M., Koelle, K., Kirschner, D.E., and J. Mills (2001). Live attenuated HIV vaccines: Predicting the tradeoff between efficacy and safety. *PNAS*. 98(6), pp. 3618-3623.
- Blower, S.M., Koelle, K., and T. Lietman (1999). Antibiotic resistance- to treat... *Nature Medicine* 5(4), p. 358.

**Research grants:**

NIGMS-supported MIDAS Center of Excellence (U54GM111274, \$2.5 million annually) <i>Center for Statistics and Quantitative Infectious Diseases (CSQUID)</i> PI: Elizabeth Halloran, Fred Hutchinson Cancer Research Center (FHCRC). Participating institutions: Univ. of Florida, Univ. of Michigan, Emory Univ., Northeastern Univ., Univ. of Georgia, Duke Univ., Univ. of Washington. Co-investigator Koelle is involved in 2 of the 4 major research projects.	2014-2019
Australian Research Council/Discovery Project (\$378,000 AUD) <i>Understanding mutation and genetic reassortment in viruses: New mathematical models of viral dynamics and evolution.</i> PIs: Mark Tanaka and Peter White (UNSW), co-PIs: Roland Regoes (ETH Zurich), Koelle. Koelle's contribution to this grant focus on the design of viral dynamic models and their statistical interface with genetic data. Koelle receives travel funding from this grant.	2011-2014
NIH (\$2.1 million) <i>Implementation science to optimize malaria vector control and disease management.</i> PI: Randall Kramer, involved researchers: Miranda, Paul, Koelle, Fowler, Moser, Osgood, Lesser, O'Meara, Platt, Dai, Turner, Vernia. Koelle's contribution to this grant focuses on modeling malaria dynamics under different control strategies; receives a small amount of summer salary from this grant.	2010-2014
James S. McDonnell Foundation Complex Systems Research Award (\$448,937) <i>Derivation and application of a dimensionless quantity for understanding viral evolution.</i> PI: Koelle	2009-2015
NSF, Advancing Theory in Biology Program (\$610,071) <i>Combining ecological and molecular models to understand the evolutionary dynamics of influenza.</i> PI: Koelle	2008-2013
Duke Global Health Institute Global Environmental Health Pilot project (\$41,450) <i>Modeling the effect of climate change and land cover change on malaria risk in the Brazilian Amazon</i> PI: James Clark, involved researchers: Denis Valle, Marcelo Urbano Ferreira, Monica da Silva Nunes, Alan Gelfand, Koelle, Alex Pfaff.	2010-2011
Duke University Center for Comparative Biology of Vulnerable Populations (\$33,000) <i>A bioeconomic approach to managing insecticide resistance in malaria control.</i> PI: Randall Kramer, involved researchers: Koelle, Zachary Brown.	2008-2009

**Invited seminar talks:**

Infectious Diseases Seminar, Harvard School of Public Health, Boston, MA	2015
Virology in Progress Mini-symposium on Ebola, UNC, Chapel Hill, NC	2014
Ecology seminar talk, UNC, Chapel Hill, NC	2014
Biology Department, University of Pennsylvania, Philadelphia, PA	2014

Program in Population, Behavior, Ecology, and Evolution, Emory University, Atlanta, GA	2013
Graduate Program in Organismic and Evolutionary Biology seminar series, University of Massachusetts, Amherst, MA	2012
Infectious Diseases Seminar, Harvard School of Public Health, Boston, MA	2012
Fred Hutchinson Cancer Research Center, Seattle, WA	2012
Ecology and Evolution seminar series, University of California at Davis, Davis, CA	2011
Odum School of Ecology seminar series, University of Georgia, Athens, GA	2011
Mathematical Biosciences Institute (MBI), The Ohio State University, Columbus, OH	2011
Center for the Study of Complex Systems, University of Michigan at Ann Arbor Ann Arbor, MI	2011
Department of Integrative Biology, University of Texas at Austin, Austin, TX	2009
Los Alamos National Laboratory, Los Alamos, NM	2009
Zentrum für Infektionsbiologie und Immunität (Humboldt-Universität) /IMPBS, Berlin, Germany	2009
Department of Ecology and Evolutionary Biology, Princeton University, Princeton, NJ	2008
Biomathematics seminar series, NC State, Raleigh, NC	2008
Program in Population, Behavior, Ecology, and Evolution, Emory University, Atlanta, GA	2007
School of Public Health, Yale University, New Haven, CT	2007
Ecology Seminar, University of North Carolina at Chapel Hill, Chapel Hill, NC	2007
Ecology and Evolutionary Biology Seminar, University of Michigan at Ann Arbor Ann Arbor, MI	2007
Center for Infectious Disease Dynamics Seminar, The Pennsylvania State University State College, PA	2006
Department of Biology, Duke University, Durham, NC (job talks)	2006
Centre for Ecological and Evolutionary Synthesis, Oslo, Norway Department of Biology, University of Oslo	2005
Department of Ecology and Evolutionary Biology, University of Michigan at Ann Arbor, Ann Arbor, MI (thesis defense)	2005

Emerging Infectious Diseases Seminar, Harvard University, Boston, MA 2005

**Invited presentations at meetings:**

European Society for Evolutionary Biology, Lausanne, Switzerland 2015

New Directions in Probabilistic Models of Evolution, Simons Institute, Berkeley, CA 2014

Epidemics<sup>4</sup>, Amsterdam, The Netherlands 2013  
*Plenary speaker*

Symposium: Combining genetic and epidemiological data to unravel infectious disease dynamics, Utrecht, The Netherlands 2013  
*Plenary speaker*

American Public Health Association (APHA) meeting, Boston, MA 2013  
*Invited session: Meeting the threat of infectious diseases with statistical models: Influenza as a case study*

Ecological Society of America, Minneapolis, MN 2013  
*Invited ignite session: Is the interaction of evolutionary and ecological dynamics widespread or a special case?*

Ecology and Evolution of Infectious Disease Conference, The Pennsylvania State University, State College, PA 2013

International Conference Frontiers in Systems and Synthetic Biology '13 (FSSB'13), Georgia Institute of Technology, Atlanta, GA 2013

Disease Dynamics 2013 Conference, Pacific Institute for the Mathematical Sciences UBC, Vancouver, Canada 2013

National Institute for Mathematical and Biological Synthesis (NIMBioS), Knoxville, TN, Investigative workshop: Modeling dengue fever 2012

Next-generation molecular and evolutionary epidemiology of infectious disease, Meeting of the Royal Society. London, England 2012

MAC-EPID symposium, University of Michigan at Ann Arbor, Ann Arbor, MI 2011

ASN Vice Presidential Symposium, Evolution meeting, Norman, OK 2011  
*Invited session: A critical look at reciprocity in ecology and evolution*

Centre for Infection Dynamics, Utrecht, The Netherlands 2011  
*Infection Dynamics: Bridging the Gap Between Theory and Application*

Climate Change: Health and Ecology, Uppsala University, Uppsala, Sweden 2010

WHO/VMI dengue vaccine modeling group, Geneva, Switzerland 2010

16 <sup>th</sup> Annual Symposium on German-American Frontiers of Science, Potsdam, Germany (Symposium organized by the German-American Academic Council, in conjunction with the National Academy of Sciences, the Alexander von Humboldt Foundation, and the Max Planck Society)	2010
Conference on Computational and Mathematical Population Dynamics, Bordeaux, France	2010
Ecological Society of America, Albuquerque, NM <i>Invited theory section symposium: The interplay of ecology and evolution at 'micro' and 'macro' scales: empirically-motivated theory</i>	2009
Gordon Research Conference, Microbial Population Biology, Proctor Academy, NH	2009
Bath Institute for Complex Systems, University of Bath, Bath, UK Mathematical Biology: Multiply Structured Populations	2009
American Mathematical Society, North Carolina State University	2009
Workshop on Evolution in Health and Disease, Lisbon, Portugal Instituto Gulbenkian de Ciência	2008
Ecological Society of America, Milwaukee, WI <i>Invited theory section symposium: Transient dynamics in ecological theory</i>	2008
Viral Paradigms: Molecules, Populations, Ecosystems and Infectious Disease, Georgia Institute of Technology, Atlanta, GA	2008
10 <sup>th</sup> Annual Symposium on Japanese-American Kavli Frontiers in Science, Shonan Village Center, Kanagawa, Japan (Symposium organized by the U.S. National Academy of Science and the Japan Society for the Promotion of Science)	2007
Environmental Changes, Microbial Systems and Infections, Madrid, Spain 12 <sup>th</sup> Scientific Symposium of the Lilly Foundation	2007
Workshop on evolution of cancer and viruses, Lisbon, Portugal Instituto Gulbenkian de Ciência	2007
Co-Evolution of Hosts and Pathogens, DIMACS workshop, Rutgers, NJ	2006
Workshop on pathogen diversity and disease epidemiology, Lisbon, Portugal Instituto Gulbenkian de Ciência	2006
Ecology and Evolution of Infectious Diseases Conference, Fort Collins, CO	2005
PI meeting: Program on Climate Variability and Human Health, Atlanta, GA	2004

**Contributed presentations at meetings:**

KITP, UC Santa Barbara, Santa Barbara, CA	2014
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Evolution, Raleigh, NC	2014
Ecology and Evolution of Infectious Disease (poster), Fort Collins, CO	2014
21st-Century Naturalists: ASN Conference, Asilomar, CA	2014
Ecological Society of America meeting, Portland, OR	2012
RAPIDD phylodynamics workshop, NESCent, Durham, NC	2011
Ecological Society of America meeting, Austin, TX	2011
Jacques-Monod Conference on Host-Parasite Interactions, Roscoff, France	2007
Ecological Society of America, Memphis, TN	2006
Ecological Society of America, Montreal, Canada	2005
European Conference on Mathematical and Theoretical Biology, Dresden, Germany	2005
Northeast Ecology and Evolution Conference, State College, PA	2005
Ecological Society of America, Portland, OR	2004
Computational and Mathematical Population Dynamics, Trento, Italy	2004
Ecological Society of America, Savannah, GA	2003

## TEACHING/TRAINING

### Prior to appointment at Duke:

Teaching assistant, University of Michigan at Ann Arbor <i>Population ecology</i> - graduate class with computer lab	2003, 2004
Teaching assistant, University of Michigan at Ann Arbor <i>Field Ecology</i> - undergraduate class with field lab	2003
Recipient of the Rackham Outstanding Graduate Student Instructor Award	2004

### After appointment at Duke:

Biology 726: <i>Dynamic Modeling of Biological Systems</i> Cross-listed with CBB 726/Math 573S Co-taught with John Harer (Duke Mathematics) Class size: 14 graduate/upper-level undergraduate students	Fall 2014
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Biology 365: <i>Physiology, Ecology, and Evolution of Infectious Disease</i> Class size: 40	Spring 2014
Biology 726: <i>Dynamic Modeling of Biological Systems</i> Class size: 12 graduate students	Fall 2013
Biology 365: <i>Physiology, Ecology, and Evolution of Infectious Disease</i> Class size: 40	Spring 2013
Sociology 180: <i>Perception of the Self, Society, and the Natural World</i> First year Baldwin Scholars class Class size: 18	Spring 2013
Biology 790: <i>Topics in Biology: Dynamic Modeling of Biological Systems</i> Class size: 7 graduate students (enrolled), 7 post-docs (auditing)	Fall 2012
Biology 146: <i>Physiology, Ecology, and Evolution of Infectious Disease</i> Class size: 37	Fall 2011
Biology 146: <i>Physiology, Ecology, and Evolution of Infectious Disease</i> Class size: 39	Spring 2011
Biology 146: <i>Physiology, Ecology, and Evolution of Infectious Disease</i> Class size: 40	Spring 2010
Biology 116: <i>Ecology and Evolution</i> Class size: 78	Fall 2009
Biology 295S: <i>Senior seminar: Ecology and Evolution of Infectious Disease</i> Class size: 12	Spring 2009
Biology 116: <i>Ecology and Evolution</i> Class size: 78	Fall 2008

**Training of post-doctoral researchers:** 3 in total since arriving at Duke

(1) Virginia Pasour (2008-2009, current position: Army Research Office (ARO) Biomathematics Program Officer, Research Triangle Park, NC); (2) Oliver Ratmann (2009-2012, current position: Sir Henry Wellcome Research Fellow, Imperial College London with Dr. Christophe Fraser, London, England) (3) Jayna Raghvani (2012-2013, current position: post-doctoral fellow, Oxford University with Dr. Oliver Pybus, Oxford, England).

**Graduate students advised:** 8 in total since arriving at Duke, including 3 current students.

(1) Shishi Luo (co-advised by Mike Reed, 2007 - 2013, Ph.D. in Mathematics); (2) Hsiang-Yu Yuan (2007 - 2013, Ph.D. in Computational Biology); (3) Mimi Lin (co-advised by Cliff Cunningham, 2008 - 2010, M.S. in Biology); (4) David Rasmussen (2008 - 2014, Ph.D. in Biology); (5) Chris Castorena (2009 -2013, M.S. in Computational Biology); (6) Stacy Scholle (2010 - current, Ph.D. in Biology); (7) Rotem Ben-Shachar (2011 - current, Ph.D. in Computational Biology); (8) Ashley Sobel (2012 - current, M.D. & Ph.D. in Biology).

**On graduate committees of:** 17 graduate students in total since arriving at Duke (excluding my own students' committees).

(1) Michelle Hersh (Ph.D. in Ecology 2009, advisor: James Clark); (2) Bernadette O'Reilly (M.S. in Biology 2009, advisor: Rytas Vilgalys); (3) Supriya Munshaw (Ph.D. in Computational Biology 2010, advisor: Thomas Kepler); (4) Seiji Kumagai (M.S. in Biology 2010, advisor: William Wilson); (5) Meredith Barrett (Ph.D. in Ecology 2011, advisor: Anne Yoder); (6) Hannah Reynolds (Ph.D. in Biology, advisor: Rytas Vilgalys); (7) David McCandlish (Ph.D. in Biology 2012, advisors: Paul Magwene, Dan McShea); (8) Zachary Brown (Ph.D. in Ecology, advisor: Randall Kramer); (9) Denis Valle (Ph.D. in Ecology 2013, advisor: James Clark); (10) Kathleen Burchardt-Pitcher (Ph.D. in Plant Pathology 2013, advisor: Marc Cubeta – NC State); (11) Colin Maxwell (pursuing Ph.D. in Biology; advisors: Paul Magwene, Ryan Baugh); (12) Mercy Akinyi (pursuing Ph.D. in Biology; advisor: Susan Alberts); (13) Erin McKenney (pursuing Ph.D. in Biology; advisors: Allen Rodrigo, Anne Yoder); (14) Mariana Gomez-Schiavon (pursuing Ph.D. in Computational Biology; advisor: Nick Buchler); (15) Kendra Smith (pursuing Ph.D. in Ecology; advisor: Christine Drea); (16) Allison Lopatkin (pursuing Ph.D. in Biomedical Engineering, advisor: Lingchong You); (17) Firas Midani (pursuing Ph.D. in Computational Biology, advisor: Lawrence David). Qualifying exam committee of: Greg Murphy (pursuing Ph.D. in Mechanical Engineering & Materials Sciences).

**Undergraduate research students:** Meredith Kamradt (independent study and work study student, 2008-2009); Priya Khatri (independent study student; completed honors thesis with Koelle, 2008-2010); Rachel Northeim (completed undergraduate honors thesis with Koelle, 2008-2009); Kiron LeBeck (summer undergraduate research student, 2010); Rachel Willcutts (independent study student, 2010).

**Publications with contributions from undergraduates:**

Koelle, K., Khatri, P., Kamradt, M., and T. Kepler (2010). A two-tiered model for studying the ecological and evolutionary dynamics of rapidly evolving viruses, with an application to influenza. *Journal of the Royal Society, Interface*. 7, pp.1257-1274. doi: 10.1098/rsif.2010.0007

Koelle, K., Kamradt, M., and M. Pascual (2009). Understanding the dynamics of rapidly evolving pathogens through modeling the tempo of antigenic change: influenza as a case study. *Epidemics*. 1, pp. 129-137. doi: 10.1016/j.epidem.2009.05.003

**Education and outreach:**

Interview with <i>Science News for Students</i> , an educational online resource for students 12 years old and up	2014
Regional Mathematics and Statistics Conference, UNC at Greensboro, Greensboro, NC, Plenary speaker; undergraduate/graduate conference promoting student research	2012
Interview with <i>NBC Learn</i> , an educational online resource for K-12 classrooms	2012
One Health Intellectual Exchange Series, Research Triangle Park, NC	2011
Howard Hughes Undergraduate Research Program, Duke University, Durham, NC	2011
Periodic Tables- Science Café at the Broad Street Café, Durham, NC	2011
Rx for Science Literacy, Evolution and Medicine teacher workshop, Duke University Workshop organized by the North Carolina Association for Biomedical Research	2011
Graduate workshop on Quantitative Immunology, San Antonio, TX	2010
Howard Hughes Undergraduate Research Program, Duke University, Durham, NC	2010

Graduate workshop on Quantitative Immunology, Santa Fe Institute, Santa Fe, NM	2009
Darwin Day, NESCent, Research Triangle Park, NC	2009
Howard Hughes Undergraduate Research Program, Duke University, Durham, NC	2009
The Institute for Mathematical Biology Education and Resources (TIMBER), Appalachian State University, Boone, NC. Plenary speaker; undergraduate/graduate conference promoting student research	2008
The North Carolina School of Science and Mathematics, Durham, NC	2008
Howard Hughes Undergraduate Research Program, Duke University, Durham, NC	2008

## SERVICE

### Journal editor for:

Theoretical Ecology Editor	March 2015- present
PLoS Computational Biology Guest Editor	October 2013- present
Proceedings of the Royal Society, Series B Associate Editor	October 2013-present

### Reviewer for:

Journals: *Science*, *Nature*, *PLoS Biology*, *eLife*, *PNAS*, *The American Naturalist*, *Evolution*, *Ecology Letters*, *Journal of Theoretical Biology*, *PLoS Computational Biology*, *Journal of Molecular Evolution*, *Trends in Ecology and Evolution*, *PLoS Pathogens*, *Proceedings of the Royal Society B*, *Journal of the Royal Society: Interface*, *Philosophical Transactions of the Royal Society B*, *Molecular Biology and Evolution*, *American Journal of Epidemiology*, *EcoHealth*, *Mathematical Biosciences*, *BMC Infectious Diseases*, *Sexually Transmitted Infections*.

### Funding bodies:

*NSF pre-proposal panel (2014)*  
*Marsden Fund reviewer (2013)*  
*Sir Henry Dale Fellowship reviewer (2013)*  
*NSF external reviewer (2011-2013)*  
*DAAD German Academic Exchange Service (2009, 2011, 2012)*  
*NSF BIO panel (2011)*  
*UK Wellcome Trust (2011)*  
*NSF Committee of Visitors for the Emerging Frontiers Division (2009)*

Session proposals:

*Banff International Research Station Proposals (2012)*

*Ecological Society of America Organized Oral Session proposals (2012)*

**Societies:**

Ecological Society of America	2003-
Society for Mathematical Biology	2007-
Society for the Study of Evolution	2011-

**Member:**

Biology Graduate Admissions Committee	2010-2014
Biology Seminar Series Committee	2012-2013 2009-2010
Duke Academic Council	2009-2013
Biology Performance Review Committee	2009-2011
Computational Biology and Bioinformatics Graduate Admissions Committee	2009-2010 2012-2014
Microbial Ecology Search Committee, Nicholas School of the Environment	2008-2009

**Other service:**

Co-organizer of Woman and Science Seminar Series, Duke University	2014-present
Co-organizer of ESA Theory vs. Empiricism Ignite Session	2014
Organizer for workshop: Rapid Evolution and Sustainability Mathematical Biosciences Institute, Columbus, OH Co-organized with Jim Cushing, Steven Munch, and Patrick de Leenheer	2012-2013
External search committee member for ETH Zurich's Ecology and Evolution of Infectious Disease position	2013
Chair of the Ecological Society of America's theoretical ecology section	2012-2013
Vice-chair of the Ecological Society of America's theoretical ecology section	2011-2012
Organizer of the RAPIDD phylodynamics workshop, NESCent, Durham, NC	2011
Session Organizer, German-American Frontiers in Science, Irvine, CA <i>Symposium organized by the German-American Academic Council, in conjunction</i>	2011

*with the National Academy of Sciences, the Alexander von Humboldt Foundation,  
and the Max Planck Society.*

Co-editor for a special issue in Interdisciplinary Perspectives on Infectious Disease	2010
Faculty of 1000 member and contributor	2009
<b>Presentations at Duke:</b>	
University Program in Genetics and Genomics, Duke University, Durham, NC	2014
Project Search (pSearch) Undergraduate Series, Duke University, Durham, NC	2013
Duke Systems Biology seminar series	2011
Duke University School of Medicine Basic Science Day	2010
Mathematical Biology seminar	2009
Center for Theoretical and Mathematical Sciences Multi-Scale Workshop	2009
Global Environmental Health Seminar	2009
Center for Theoretical and Mathematical Sciences Marketplace of Ideas	2009
Medical School Infectious Disease Interest Group	2009
Center for RNA Biology	2008
Global change seminar	2008
The Center for Nonlinear and Complex Systems (CNCS) Seminar Series	2008
Systematics Discussion Group	2008
Computational Biology & Bioinformatics Seminar Series	2008
Ecology Seminar	2007