

## **Katia Koelle**

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### **Professional Position**

8/07-present      Assistant Professor  
Dept. of Biology, Duke University

### **Education**

- 2006-2007      Post-doctoral fellow at the Center for Infectious Disease Dynamics  
The Pennsylvania State University  
Advised by Bryan Grenfell
- 2001-2005      Ph.D. in Ecology and Evolutionary Biology  
University of Michigan, Ann Arbor  
Advised by Mercedes Pascual  
Thesis title: 'Host immunity and climate forcing in cholera dynamics and evolution'
- 1999-2003      Certificate in Complex Systems  
Center for the Study of Complex Systems  
University of Michigan, Ann Arbor
- 1993-1997      B.S. in Biological Sciences  
Stanford University

### **Publications** (\*corresponding author)

1. **Koelle, K.\***, Pascual, M. (*in revision*) Understanding the dynamics of rapidly evolving pathogens through modeling the tempo of antigenic change: influenza as a case study
2. Cobey, S., **Koelle, K.\*** (2008) Capturing escape in infectious disease dynamics. *Trends in Ecology and Evolution*. 23(10), pp.572-577.
3. Nagao, Y., **Koelle, K.\*** (2008) Decreases in dengue transmission may act to increase the incidence of Dengue Hemorrhagic Fever. *Proceedings of the National Academy of Sciences*. 105(6), pp. 2238-2243.
4. Pascual, M.\*, Cazelles, B., Bouma, M., Chaves. L., **Koelle, K.** (2008) Shifting patterns: malaria dynamics and rainfall variability in an African highland *Proceedings of the Royal Society, Series B, Biological Sciences*. 275. pp.123-132.
5. Finkelman, B.\*, Viboud, C., **Koelle, K.**, Ferrari, M., Bharti, N., Grenfell, B. (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.
6. **Koelle, K.\***, Cobey, S., Grenfell, B., & Pascual, M. (2006) Epochal evolution shapes the phylodynamics of interpanemic influenza A (H3N2) in humans. *Science*. 314. pp. 1898-1903.

7. **Koelle, K.\***, Pascual, M., Yunus, M. (2006) Serotype cycles in cholera dynamics. *Proceedings of the Royal Society, Series B, Biological Sciences*. 273. pp. 2879-2886.
8. Pascual, M.\* , **Koelle, K.**, Dobson, A. (2006) Hyperinfectivity in Cholera: A New Mechanism for an Old Epidemiological Model? *PLoS Medicine*. 3 (6). p. e280.
9. **Koelle, K.**, Rodó, X., Pascual, M.\* , Yunus, M., & Mostafa, G. (2005) Refractory periods to climate forcing in cholera dynamics. *Nature*. 436. pp. 696-700.
10. **Koelle, K.\***, Pascual, M., & Yunus, M. (2005) Pathogen adaptation to seasonal forcing and climate change. *Proceedings of the Royal Society, Series B, Biological Sciences*. 272. pp. 971-977.
11. **Koelle, K.\*** & Vandermeer, J. (2005) Dispersal-induced desynchronization: from metapopulations to metacommunities. *Ecology Letters*. 8(2). pp. 167-175.
12. Buckee, C.\* , **Koelle, K.**, Mustard, M. & Gupta, S. (2004) The effects of host contact network structure on pathogen diversity and strain structure. *Proceedings of the National Academy of Sciences*. 101(29). pp.10839-10844.
13. **Koelle, K.** & Pascual, M.\* (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.
14. Savit, R.\* , **Koelle, K.**, Treynor, W., Gonzalez, R. (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).
15. Blower, S.M.\* , **Koelle, K.**, & Mills, J. (2002) in *Quantitative Evaluation of HIV Prevention Programs*, eds. Kaplan, E. H. & Brookmeyer, R. (Yale University Press, New Haven, CT).
16. Blower, S.M.\* , **Koelle, K.**, Kirschner, D.E., & Mills, J. (2001) Live attenuated HIV vaccines: Predicting the tradeoff between efficacy and safety. *Proceedings of the National Academy of Sciences* 98(6), pp. 3618-3623.
17. Blower, S.M.\* , **Koelle, K.**, & Lietman, T. (1999) Antibiotic resistance- to treat... *Nature Medicine* 5(4), p. 358.

## Grant Support

**James S. McDonnell Foundation** Research Award for Studying Complex Systems (\$448,937). *Derivation and application of a dimensionless quantity for understanding viral evolution*. (May 2009 - May 2013) PI: Koelle

**National Science Foundation** Advancing Theory in Biology Program (\$610,071). *Combining ecological and molecular models to understand the evolutionary dynamics of influenza*. (September 2008 – September 2011) PI: Koelle

**National Institute of Health** Intergovernmental Personnel Act: *Research and Policy in Infectious Disease Dynamics (RAPIDD): Epidemic model hierarchies and model validation*. (August 2008 - August 2009)

**Duke University Center for Comparative Biology of Vulnerable Populations** Pilot project (\$33,000) *A Bioeconomic Approach to Managing Insecticide Resistance in Malaria Control* (August 2008 – March 2009) PI: Randall Kramer, co-PI: Katia Koelle, doctoral student: Zachary Brown.

## **Invited Talks** (\* future events)

### 2008

American Mathematical Society, North Carolina State University, April 4, 2009\*

Dept. of Integrative Biology, University of Texas, Austin, March 26, 2009\*

Zentrum für Infektionsbiologie und Immunität (Humboldt-Universität) /IMPBS, Berlin, Germany, January 8, 2009\*

The Institute for Mathematical Biology Education and Resources (TIMBER), Appalachian State University, November 14, 2008\*

Dept. of Ecology and Evolutionary Biology, Princeton University, October 23, 2008\*

Instituto Gulbenkian de Ciência, Lisbon, Portugal, September 26, 2008

Theory Section Symposium: Transient Dynamics and its Implications for Ecological Theory, Ecological Society of America, Milwaukee, WI, August 6, 2008

Howard Hughes Undergraduate Research Program, June 26, 2008

Center for RNA Biology, Duke University, April 23, 2008

Biomathematics Seminar Series, NC State, Raleigh, NC, March 18, 2008

Global change seminar, Duke University, Durham, NC, February 28, 2008

The Center for Nonlinear and Complex Systems (CNCS) Seminar Series, Duke University, Durham, NC, February 26, 2008

Systematics Discussion Group, Duke University, Durham, NC, February 7, 2008

Computational Biology & Bioinformatics Seminar Series, Duke University, Durham, NC, January 28, 2008

The North Carolina School of Sciences and Mathematics, Durham, NC, January 23, 2008

Viral Paradigms: Molecules, Populations, Ecosystems and Infectious Disease, Georgia Institute of Technology, Atlanta, GA, January 14-16, 2008

### 2007

10<sup>th</sup> Annual Symposium on Japanese-American Kavli Frontiers in Science (organized by the U.S. National Academy of Science and the Japan Society for the Promotion of Science), Shonan Village Center, Kanagawa, Japan, December 1-3, 2007

Environmental Changes, Microbial Systems and Infections, 12<sup>th</sup> Scientific Symposium of the Lilly Foundation, Madrid, Spain, November 15-16, 2007

Program in Population, Behavior, Ecology, and Evolution, Emory University, October 19, 2007

School of Public Health, Yale University, October 11, 2007

Ecology Seminar, UNC- Chapel Hill, October 4, 2007

Ecology Seminar, Duke University, September 14, 2007

Ecology and Evolutionary Biology Seminar, University of Michigan, March 8, 2007

Instituto Gulbenkian de Ciência, Lisbon, Portugal, February 2, 2007

#### 2006

Co-Evolution of Hosts and Pathogens, DIMACS workshop, Rutgers, NJ, October 9-11, 2006

Workshop on Pathogen Diversity and Disease Epidemiology, Instituto Gulbenkian de Ciência, Lisbon, Portugal, September 17-20, 2006

Center for Infectious Disease Dynamics Seminar, Penn State, PA, February 24, 2006

Duke University, Durham, NC, January 30 & 31, 2006 (job talks)

#### 2005

Centre for Ecological and Evolutionary Synthesis, Dept. of Biology, University of Oslo, Norway, October 7, 2005

Department of Ecology and Evolutionary Biology, University of Michigan, Ann Arbor, MI, September 9, 2005. (Thesis defense)

Emerging Infectious Diseases Seminar, Harvard University, Boston, MA, May 16, 2005

#### 2004

PI meeting: Program on Climate Variability and Human Health, Atlanta, GA, March 3, 2004

**Meetings and working groups** (bold denotes talk also given, \* denotes future events)

- **Workshop on Evolution in Health and Disease, Instituto Gulbenkian de Ciência, Lisbon, Portugal, September 22-26, 2008**
- **Ecological Society of America, Milwaukee, Wisconsin, August 4-8, 2008 (Theory Symposium Speaker)**
- **RAPIDD: Research and Policy in Infectious Disease Dynamics: Epidemic model hierarchies and model validation, Penn State, PA, April 9-11, 2008**
- **Viral Dynamics, Georgia Tech, January 14-16, 2008**
- **10<sup>th</sup> Annual Symposium on Japanese-American Kavli Frontiers in Science, Kanagawa, Japan, December 1-3, 2007**
- **Environmental Changes, Microbial Systems and Infections, 12<sup>th</sup> Scientific Symposium of the Lilly Foundation, Madrid, Spain, November 15-16, 2007**
- **Jacques-Monod Conference on the Evolutionary Genetics of Host-Parasite Interactions Conference, September 23-26, 2007**
- Flu Seasonality Workshop, Penn State, PA, October 19-20, 2006
- **Ecological Society of America, Memphis, Tennessee, August 7-11, 2006**
- Ecology of Zoonoses Workshop, Center of Alpine Ecology, Trento, Italy, July 10-14, 2006
- Ecology and Evolution of Infectious Diseases Conference, Penn State, PA, May 18-20, 2006
- **Ecological Society of America, Montreal, Canada, August 8-12, 2005**

- **European Conference on Mathematical and Theoretical Biology, Dresden, Germany, July 18-22, 2005**
- **Ecology and Evolution of Infectious Diseases Conference, Fort Collins, CO, May 19-20, 2005**
- **Northeast Ecology and Evolution Conference, State College, PA, March 18-19, 2005**
- **Complex Systems Advanced Academic Workshop, Ann Arbor, MI, November 5, 2004**
- **Ecological Society of America, Portland, OR, August 2-6, 2004**
- **Computational and Mathematical Population Dynamics, Trento, Italy, June 21-25, 2004**
- **Complex Systems Advanced Academic Workshop, Ann Arbor, MI, February 19, 2004**
- **Ecological Society of America, Savannah, GA, August 4-8, 2003**
- National Center for Ecological Analysis and Synthesis
  - Working group participant: Inference of Mechanistic Models
  - Working group participant: Seasonality of Infectious Diseases
  - Working group participant: The Ecology of Marine Diseases

## **Awards**

- 2004 Recipient of the Lotka-Volterra Award of the Theoretical Ecology section of the ESA  
 2004 Recipient of the Rackham Outstanding Graduate Student Instructor Award, U. of Michigan  
 2003 Recipient of the E.C. Pielou Award of the Statistical Ecology section of the ESA

## **Service**

Referee for *Science*, *PLoS Biology*, *The American Naturalist*, *Ecology Letters*, *Journal of Theoretical Biology*, *PLoS Pathogens*, *Journal of the Royal Society: Interface*, *EcoHealth*, *Mathematical Biosciences*, *BMC Infectious Diseases*, *Sexually Transmitted Infections*.

## **Teaching**

- Spring 2009 Ecology and Evolution of Infectious Diseases (anticipated class size: 15)  
 Fall 2008 Principles of Ecology and Evolution (class size: 80)