

## **Kevin Gross**

Web CV  
(for a complete CV please email)

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Biomathematics Graduate Program  
Departments of Statistics  
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### EDUCATION

Ph.D., Zoology and Statistics. University of Wisconsin-Madison, Madison WI. Advisors: Prof. Anthony R. Ives and Erik V. Nordheim. Research Area: Statistical ecology and population dynamics. May 2003.  
M.S., Statistics. University of Wisconsin-Madison, Madison WI. May 2000.  
B.S., Biology. Duke University, Durham, NC. May 1996.

### POSITIONS HELD

*Assistant Professor.* North Carolina State University, Department of Statistics, Raleigh NC. Core faculty member of Biomathematics Graduate Program. Fall 2003 – present. Associate faculty member of the Department of Biology Fall 2004 – present.

### PUBLICATIONS

- Gross, K.** 2008. Positive interactions among competitors can produce species-rich communities. *Ecology Letters* 11: 929-936.
- Gross, K.** 2008. Fusing spatial resource heterogeneity with a competition-colonization trade-off in model communities. *Theoretical Ecology* 1: 65-75.
- Gross, K.,** and B. J. Cardinale. 2007. Does species richness drive community productivity or vice versa? Reconciling historical and contemporary paradigms in competitive communities. *American Naturalist*, 170: 207-220.
- Gross, K.,** E. J. Kalendra, B. R. Hudgens, and N. M. Haddad. 2007. Robustness and uncertainty in estimates of butterfly abundance from transect counts. *Population Ecology*, 49: 191-200.
- Gross, K.,** W. F. Morris, M. S. Wolosin, and D. F. Doak. 2006. Modeling vital rates improves estimation of population projection matrices. *Population Ecology*, 48: 79-89.
- Gross, K.,** and B. J. Cardinale. 2005. The functional consequences of random versus ordered species extinctions. *Ecology Letters*, 8: 409-418.
- Gross, K.,** A. R. Ives, and E. V. Nordheim. 2005. Estimating fluctuating vital rates from time-series data: a case study of aphid biocontrol. *Ecology*, 86:740-752.
- Gross, K.,** B. A. Craig, and W. D. Hutchison. 2002. Bayesian estimation of a demographic matrix model from stage-frequency data. *Ecology* 83: 3285-3298.
- Gross, K.** 2002. Efficient data collection for estimating growth rates of structured populations. *Ecology* 83:1762-1767.
- Gross, K.** and A. R. Ives. 1999. Inferring host-parasitoid stability from patterns of parasitism among patches. *American Naturalist* 154:489-496.
- Gross, K.,** J. R. Lockwood III, C. C. Frost, and W. F. Morris. 1998. Modeling controlled burning and trampling reduction for conservation of *Hudsonia montana*. *Conservation Biology* 12:1291-1301.
- Harvey, C. J., **K. Gross,** V. H. Simon, and J. Hastie. How trophic and fishery interactions with Pacific hake might affect the rebuilding times of overfished rockfish. *Marine Ecology Progress Series*, in

press.

- Haddad, N. M., B. R. Hudgens, C. D. Damiani, **K. Gross**, and D. Kuefler. 2008. Optimal monitoring for rare butterfly populations. *Conservation Biology* 22: 929-940.
- Abbott, K.C., W. F. Morris, and **K. Gross**. 2008. Simultaneous effects of food limitation and inducible resistance on herbivore population dynamics. *Theoretical Population Biology* 73:63-78.
- Kilpatrick, A.M., D. LaPointe, C.T. Atkinson, B.L. Woodworth, J.K. Lease, M.E. Reiter, and **K. Gross**. 2006. Effects of chronic avian malaria (*Plasmodium relictum*) infection on the reproductive success of Hawaii Amakihi (*Hemignathus virens*). *Auk*, 123: 764-774.
- Doak, D.F., **K. Gross**, and W.F. Morris. 2005. Understanding and predicting the effects of sparse data on demographic analyses. *Ecology*, 86: 1154-1163.
- Nol, P., T. E. Rocke, **K. Gross**, and T. M. Yuill. 2004. Prevalence of active *Clostridium botulinum* type C in the gastrointestinal tracts of tilapia (*Oreochromis mossambicus*) in the Salton Sea. *Journal of Wildlife Diseases* 40:414-419.
- Cardinale, B. J., A. R. Ives, C. T. Harvey, and **K. Gross**. 2003. Biodiversity and biocontrol: emergent impacts of a multi-enemy assemblage on pest suppression and crop yield in an agroecosystem. *Ecology Letters*, 6: 857-865.
- Dodson, S. I., A. Z. Grishanin, **K. Gross**, and G. A. Wyngaard. 2003. Morphological analysis of cryptic species in the *Acanthocyclop syemalis* species complex. *Hydrobiologia*, 500:131-143.
- Rooney, T. P., and **K. Gross**. 2003. A demographic study of deer browsing impacts on *Trillium grandiflorum*. *Plant Ecology* 168: 267-277.
- Ives, A. R., **K. Gross**, and V. A. A. Jansen. 2000. Periodic mortality events in predator-prey systems. *Ecology* 81: 3330-3340.
- Ives, A. R., J. L. Klug, and **K. Gross**. 2000. Stability and species richness in complex communities. *Ecology Letters* 3:399-411.
- Olson, A., A. R. Ives, and **K. Gross**. 2000. Spatially aggregated parasitism on pea aphids, *Acyrtosiphon pisum*, caused by random foraging behavior of the parasitoid *Aphidius ervi*. *Oikos* 91:66-76.
- Underwood, N., W. Morris, **K. Gross**, and J. R. Lockwood III. 2000. Induced resistance to Mexican bean beetles in soybean: variation among genotypes and lack of correlation with constitutive resistance. *Oecologia*, 122:83-89.
- Ives, A. R., **K. Gross**, and J. L. Klug. 1999. Stability and variability in competitive communities. *Science* 286:542-544.

#### GRANTS AWARDED

- Collaborative:MSPA-CSE: Analysis and detection of transient dynamics in ecological systems. NSF collaborative proposal with Alan Hastings and Tony Ives. Funded 10/1/04-9/31/07.
- Bioinformatics for IPM: Using Consultant-Generated Data to Solve Difficult Problems in Applied Insect Ecology. Subcontract on USDA-ARS proposal led by Jay Rosenheim. Funded 2/15/07-2/14/10.

#### PRESENTATIONS

- Does productivity drive diversity or vice versa? Reconciling old and new viewpoints in model communities. ESA, San Jose, CA 2007.
- Estimating rare butterfly abundance by combining multiple data types with simple population models. ENAR meetings, Atlanta, GA, March 2007 (invited).
- Does species diversity drive ecosystem productivity or vice versa? Towards a unification of historical and contemporary paradigms. NCSU Biomathematics seminar, January 2007.
- Exploring the connections between community productivity and diversity using metacommunity models. Virginia Tech Ecology and Evolutionary Biology seminar. November 2006.
- Estimating butterfly abundances from count data. Ecological Society of America (ESA), Memphis, TN, August 2006.
- Estimating butterfly abundances from count data. Statistics, Combinatorics, Mathematics and Applications meeting, Auburn, AL, December 2005 (invited).
- Two problems in statistical ecology. University of Chicago Center for Integrating Statistical and

Environmental Science seminar, October 2005.  
Modeling vital rates improves estimation of population projection matrices. ESA, Montreal, QC, August 2005.  
Two problems in statistical ecology. JSM New Researcher's Conference, Minneapolis, MN, August 2005.  
Estimating abundances from count data for species with discrete generations. WNAR / IBS, Fairbanks, AK, June 2005.  
Does extinction order matter? Modeling the functional consequences of random vs. ordered extinction. Duke University Program in Ecology seminar, April 2005.  
Does extinction order matter? Modeling the functional consequences of random vs. ordered extinction. NCSU Biomathematics seminar, February 2005.  
Bootstrap for broader inference in biodiversity – ecosystem function experiments (poster). Fifth Winemiller Symposium, Columbia, MO, October 2004.  
Bootstrap for broader inference in biodiversity – ecosystem function experiments. Joint Statistical Meetings, Toronto, ON, August 2004.  
On the scope of inference for biodiversity – ecosystem function experiments. ESA, Portland, OR, August 2004.  
On the scope of inference for biodiversity – ecosystem function experiments. NCSU Statistics faculty sampler, Raleigh, NC, January 2004.  
Do parasitoids control pea aphids in alfalfa? Estimating interspecific effects from ecological time series. NCSU Zoology seminar, Raleigh, NC, January 2004.  
Do parasitoids control pea aphids in alfalfa? A state-space approach to analyzing monitoring data. Entomological Society of America, Fort Lauderdale, FL, November 2002.  
Modeling population dynamics with a mechanistic description of process error. ESA, Tucson, AZ, August 2002 (invited).  
Bayesian analysis of a demographic matrix model using multiple survey data. ENAR / IBS, Charlotte, NC, March 2001.  
A Bayesian approach to demographic matrix modeling (poster). ESA, Snowbird, UT, August 2000.  
Process models for long-term data: Two examples. LTER All-Scientists Meeting, Snowbird, UT, August 2000 (invited).  
A Bayesian approach to demographic matrix modeling (poster). ENAR / IBS, Chicago, IL, March 2000.  
Inferring host-parasitoid stability from patterns of parasitism. ESA, Spokane, WA, August 1999.  
Optimal sample allocation for demographic matrix models. Ninth Lukacs Symposium, Bowling Green, OH, April 1999.

### COURSES TAUGHT

Probability and Statistics for the Physical Sciences (Statistics 380), NCSU, Fall 2003 - 2007.  
Biomathematics II (Biomath 772), NCSU, Spring 2004 - 2008.  
Experimental Statistics for Biological Sciences II (Statistics 512), NCSU, Fall 2006 - 2007.

### STUDENTS ADVISED

Degrees completed:

Matthew Hamilton. Masters of Science (MS) in Biomathematics completed August 2007. Thesis title: "Local dispersal and coexistence in a metacommunity model with trophic structure"

Yabo Wu. Masters of Biomathematics (MBMA) completed May 2006. Project title: "Using first-order autoregressive models to approximate nonlinear birth-death processes"

Degrees in progress:

Judith Canner. Ph.D. student in Biomathematics and Zoology. Fall 2005 – present.

Ian Fiske. Ph.D. student in Statistics. Fall 2006 – present.

EDITORIAL SERVICE

Associate Editor, *Ecology Letters*, January 2007 – present.

Refereed papers for: *American Naturalist*, *Biocontrol*, *Biometrics*, *Biotropica*, *Computational Statistics and Data Analysis*, *Conservation Biology*, *EcoHealth*, *Ecology*, *Ecology Letters*, *Ecoscience*, *Frontiers in Ecology and the Environment*, *Integrative and Comparative Biology*, *Journal of Agricultural, Biological, and Environmental Statistics*; *Journal of Animal Ecology*, *Journal of Mathematical Biology*, *Mathematical Biosciences*, *Oecologia*, *PNAS*, *Proceedings of the Royal Society Series B*.

OTHER SERVICE

Author and maintainer of the R package mvnmle (multivariate normal maximum likelihood estimation).

<http://cran.r-project.org/>

Co-organized oral session “What is the right size model? Views on model complexity and parsimony from different statistical paradigms.” ESA, San Jose, CA, August 2007.