

Scott Curtis Merrill

Research Assistant Professor
Managing Director of the Social Ecological Gaming and Simulation (SEGS) Laboratory

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Education

Ph. D., Ecology, Colorado State University, 2007
B.S., Mathematics, University of Oregon, 1994
B.S., Psychology, University of Oregon, 1994

Professional Appointments

2011-present	Research Assistant Professor , Department of Plant and Soil Science, University of Vermont
2014-present	Managing Director , Social Ecological Gaming and Simulation Laboratory, University of Vermont. http://www.uvm.edu/~segs
2015	Acting Policy and Governance Team Leader , Research on Adaptation to Climate Change. VT EPSCoR (Track 1)
2015	Acting Social Dimensions Team Leader , North East Water Resources Network. VT EPSCoR (Track 2)
2007-2011	Post-Doctoral Research Fellow , Department of Bioagricultural Sciences and Pest Management, Colorado State University
2005-2007	Research Associate , Department of Bioagricultural Sciences and Pest Management, Colorado State University
2000-2007	Ph.D. Graduate Student , Graduate Degree Program in Ecology, Colorado State University

Professional Interests

Data simulation, spatial modeling, landscape ecology, climate change, population modeling, conservation science, plant-insect interactions, Integrated Pest Management (IPM), biological control, movement analysis and dispersal, systems ecology, and using games and simulations to teach and provoke social change

Grant Proposals and Whitepapers (*Funded, +Submitted)

+The Minerva Initiative. Department of Defense. 2017-2019. PI. Coupling multi-model inference and agent-based modeling: applications in biosecurity and public health arenas

+NSF EPSCoR. 2016-2021 Co-PI. Lake Champlain Basin Resilience to Extreme Events. \$20,000,000

*USDA-NIFA Agriculture and Food Research Initiative. 2015-2019 Co-PI. A human behavioral approach to reducing the impact of livestock pest or disease incursions of socio-economic importance. \$7,400,000

*USDA-NIFA Agriculture and Food Research Initiative. 2009-2012 Co-PI. Development of outbreak prediction models for the improvement of Russian wheat aphid pest management strategies. \$103,218

*USDA-CSREES Crops at Risk 2007-2011 Co-PI. Validating a spatially-explicit precision forecasting model for Russian wheat aphid densities on small grain crops. \$151,526

Publications (*Refereed, +Outreach, xBook Section)

*Merrill, S. C., T. O. Holtzer, F. B. Peairs, and P. J. Lester (2015) Validating spatiotemporal predictions of an important pest of small grains. *Pest Management Science*. 71 (1): 131–138. DOI 10.1002/ps.3778.

*Merrill, S. C., F. B. Peairs, T. L. Randolph, G. J. Michels Jr. and C. B. Walker (2014) Examining the competitive advantage of *Diuraphis noxia* (Hemiptera: Aphididae) biotype 2 over biotype 1. *Journal of Economic Entomology* 107 (4): 1471-1475.

*Merrill, S. C., Walter, S. M., F. B. Peairs, and E. M. Schleip (2013) The distribution of European corn borer moths in sprinkler irrigated corn. *Journal of Economic Entomology*. 106(5):2084-92

*Kerzicnik, L.M., F.B. Peairs, P.E. Cushing, M. Draney, and S.C. Merrill (2013) Faunistic composition of spiders in eastern Colorado agroecosystems and analysis of spider density and diversity in crop-intensified agroecosystems. *Environmental Entomology* 42(1):131-42

*Merrill, S. C., and F. B. Peairs (2012) Quantifying Russian wheat aphid pest intensity across the Great Plains. *Environmental Entomology*. 41 (5): 1505-1515

Publications (*Refereed, †Outreach, *Book Section) - Continued

- *Pucherelli, S. F., F. B. Peairs, S. C. Merrill, and T. L. Randolph (2012) Russian Wheat Aphid (Hemiptera: Aphididae) Reproduction and Development on Five Noncultivated Grass Hosts. *Arthropod-Plant Interactions*. 6(1): 67-73
- *Merrill, S. C., Walter, S., F. B. Peairs, and J. A. Hoeting (2011) Spatial variability of Western bean cutworm populations in irrigated corn. *Environmental Entomology*. 40(3):654-660
- *Merrill, S. C., A. Gebre-Amlak, J. S. Armstrong, and F. B. Peairs (2010) Degree day prediction models for Sunflower stem weevil (Curculionidae: Coleoptera) development and adult emergence. Pages 9-11 in A. Gebre-Amlak, D. A. Kaan, and J. Deering, editors. Colorado State University Golden Plains Area 2010 Agricultural Handbook. Cooperative Extension, Colorado State University Fort Collins, CO.
- *Merrill, S. C., A. Gebre-Amlak, J. S. Armstrong, and F. B. Peairs (2010) Nonlinear Degree-Day Models of the Sunflower Stem Weevil (Coleoptera: Curculionidae). *Journal of Economic Entomology* 103(2): 303-307
- *Merrill, S. C., T. O. Holtzer, and F. B. Peairs (2010) Examining spatial correlation between fall and spring population densities of the Russian wheat aphid (Hemiptera: Aphididae). Colorado State Univ. Agric. Exp. Sta. Tech. Rep. TR10-15
- *Merrill, S. C. and T. O. Holtzer (2010) Estimating Russian wheat aphid (Homoptera: Aphididae) overwintering success using weather data. Colorado State Univ. Agric. Exp. Sta. Tech. Rep. TR10-14
- *Merrill, S. C., T. O. Holtzer, F. B. Peairs, and P. J. Lester (2009) Modeling Spatial Variation of Russian Wheat Aphid Overwintering Population Densities in Colorado Winter Wheat. *Journal of Economic Entomology* 102(2): 533-541
- *Merrill, S. C., T. O. Holtzer, and F. B. Peairs (2009) Russian Wheat Aphid, *Diuraphis noxia* (Kurdjumov), Reproduction and Development with a Comparison of Intrinsic Rates of Increase to Other Important Small Grain Aphids: A Meta-analysis. *Environmental Entomology* 38(4): 1061-1068
- *Merrill, S. C., C. B. Walker, F. B. Peairs, T. L. Randolph, S. D. Haley, and R. W. Hammon (2009) Displacement of Russian wheat aphid, *Diuraphis noxia* (Kurdjumov), Biotype 1 in Colorado by Russian wheat aphid biotypes virulent to the wheat resistance gene *Dn4*. Colorado State Univ. Agric. Exp. Sta. Tech. Bull. TB09-01, 19 pp.
- *Randolph, T. L., S. C. Merrill, and F. B. Peairs (2008) Reproductive Rates of Russian Wheat Aphid (Hemiptera: Aphididae) Biotypes 1 and 2 on a Susceptible and a Resistant Wheat at Three Temperature Regimes. *Journal of Economic Entomology* 101 (3): 955-958.

Publications (*Refereed, †Outreach, *Book Section) - Continued

*Merrill, S. C., T. Randolph, C. B. Walker, and F. B. Peairs (2008) 2007 Russian wheat aphid biotype survey results for Colorado. Pp. 43 - 44 in Johnson, J. J., ed. 2008. Making better decisions: 2007 Colorado wheat variety performance trials. Colorado State Univ. Agric. Exp. Sta. Tech. Rep. TR08-08, 47 pp.

*Merrill, S. C., F. B. Peairs, H. R. Miller, T. L. Randolph, J. B. Rudolph, and E. E. Talmich (2008) Reproduction and Development of Russian Wheat Aphid Biotype 2 on Crested Wheatgrass, Intermediate Wheatgrass, and Susceptible and Resistant Wheats. *Journal of Economic Entomology* 101 (2): 541-545.

*Peairs, F. B., J. B. Rudolph, T. L. Randolph, and S. C. Merrill (2008) 2007 Colorado field crop insect management research and demonstration trials. Colorado State Univ. Agric. Exp. Sta. Tech. Rep. TR08-06, 34 pp.

†Merrill, S. C., T. L. Randolph, C. B. Walker, and F. B. Peairs (2007) 2007 Russian wheat aphid biotype survey results released. *High Plains Journal*. November.
<http://www.hpj.com/archives/2007/nov07/nov26/2007Russianwheataphidbiotyp.cfm>

†Merrill, S. C., T. L. Randolph, C. B. Walker, and F. B. Peairs (2007) 2006 Russian wheat aphid biotype survey results for Colorado. *High Plains Journal*. April.
<http://www.hpj.com/archives/2007/apr07/apr30/2006Russianwheataphidbiotyp.cfm>

*Randolph, T. L., F. B. Peairs, S. Merrill, M. Koch, and C. B. Walker (2007) Yield Response to Russian Wheat Aphid (Homoptera: Aphididae) in Mixtures of Resistant and Susceptible Winter Wheats. *Southwestern Entomologist*. March. 32 (1): 7-15.

Manuscripts in Revision or Preparation

Merrill, S. C. and F. B. Peairs (Submitted) Climate change will alter the timing of pest attacks. *Pest Management Sciences*

Scheinert, S., Zia, A., Koliba, C., Merrill, S. C. (Submitted) Growing Collaborations: Forecasting Growth in Partnership Networks Using a Bottom-Up Approach. *Plos One*

Wiltshire, S., Logan, K., Merrill, S.C., and Fooks, J. (Submitted) Size matters: Innovation diffusion in a clustered social network. *Journal of Behavioral and Experimental Economics*

Zia, A., Messer, K., Ding, S., Miao, H., Suter, J., Guilfoos, T., Trandafir, S., Uchida, E., Tsai, Y., Merrill, S., Turnbull, S., Koliba, C., (Submitted) Inducing cooperative behaviors for managing non-point source pollution: Evidence from a decision game in an idealized watershed. *Ecology and Society*

Wiltshire, S., Dodds, P., Zia, A., Merrill, S.C., Koliba, C. and Smith, J. (In Preparation) Evaluating the Effect of Producer Specialization on Disease Resilience in a Simulated Livestock Production Chain

Manuscripts in Revision or Preparation - Continued

Ding, S., Fooks, J. R., Guilfoos, T., Messer, K. D., Merrill, S. C., Suter, J., Uchida, E., Zia, A. (In Preparation). Clustering Behavior in a Non-point source Pollution Experiment by Strategic Type.

Ding, S., Fooks, J. R., Guilfoos, T., Messer, K. D., Merrill, S. C., Suter, J., Uchida, E., Zia, A. (In Preparation). Thinking Outside the Lab: Using Agent Based Modeling to Extrapolate Strategies from a Non-point Source Pollution Experiment to the Watershed Level

Logan, K., Wiltshire, S., Merrill, S. C., Koliba, C., and Zia, A., (In Preparation) Using Farmer-Field Schools to build bridges between farmers and government agencies to achieve climate change-related behavioral change: Letting Farmers Learn for a Change.

Tewksbury, J. J., C. A. Deutsch, D. S. Battisti, S. C. Merrill, R. B. Huey, and R. L. Naylor. (In Preparation) Global warming, pest pressure, and global food security. Target Journal: Science

Randolph, T.L., Merrill, S. C., Walker C. B., Kerzicnik, L.M., F.B. Peairs, Koch M., & Ode, P. J. (In Preparation) Effects of the Native Natural Enemy Complex on Russian Wheat Aphid. Target Journal: Biological Control

Merrill, S.C. (In Preparation) Examining the effect of reduction of the random mating and oviposition assumptions in *Bt* corn. Target Journal: Pest Management Sciences

Zia, A., Yushiou Tsai, Scott Turnbull, Shanshan Ding, Haoran Miao, Christopher Koliba, Scott Merrill, Kent Messer, Jordan Suter, Jacob Fooks, Todd Guilfoos, Simona Trandafir, Emi Uchida (Apr 2016) Simulating the effects of alternate control strategies on heterogeneous farmer behaviors and water quality outcomes: an agent based modeling application in Mississquoi watershed of Lake Champlain Basin. *Journal of Economic Dynamics and Control*

Zia, A., Yushiou Tsai, Scott Turnbull, Shanshan Ding, Christopher Koliba, Scott Merrill, Kent Messer, Haoran Miao, Jordan Suter, Jacob Fooks, Todd Guilfoos, Simona Trandafir, Emi Uchida (Apr 2016) Understanding the effects of alternate incentive mechanism and monitoring regimes on joint production technology adoption and farmer behaviors: Experimental simulations from an agent based model of Mississquoi watershed in Lake Champlain Basin *Ecological Economics*

Professional Activities and Teaching Activities

Courses taught:

- Quantitative Thinking in the Life Sciences (Fall 2012-2015). Teaching a quantitative foundation including probability, statistics, modeling, and data simulation.
- Ecological Gaming (Spring 2013-2015 and Fall 2013). An examination of the fundamental principles of ecology through the lens of simulation game platforms.
- Experimental Economics: Gaming and Simulation (Fall 2014). Facilitating a team-taught course studying classic experimental economic games and relevant literature

Professional Activities and Teaching Activities -Continued

Advising and mentoring:

- Graduate Committees: Rachel Schattman, Ph.D. Candidate, Chase Stratton, Ph.D., Alison Banks, MS., Elisabeth Hodgdon Ph.D., Sam Talbot, MS., Serge Wiltshire, Ph.D., and Kyle Motley MS.
- North East Water Resources Network Intern mentor: Nour El-Naboulsi (2015), Arkia Wynn (2015), Sophia Earll (2014) and Roberta Molokandov (2014).
- Honors Thesis Committee: Sam Tuckerman

Alan Alda Communicating Science Workshop February 1-2, 2016

Organizer: Three Day Writing Challenge

Reviewer: *Plos One*, *Global Change Biology*, *Pest Management Sciences*, *Elementa*, *Insect Science*, *Computers and Electronics in Agriculture*, *Journal of Pest Science*, *Journal of Environmental Management*, *Crop Protection*

Oral Presentations

Merrill, S. C. (March 2016 - pending) Experimental Gaming Research, gathering data to understand Social-Ecological Systems. Plant and Soil Science Departmental Seminar. Burlington, VT

Merrill, S. C. (2016) Experimental gaming research: the next step in data gathering and complex systems analysis. Research on Adaptation to Climate Change Retreat. Burlington, VT.
http://epscor.w3.uvm.edu/2/node/2202?URL=http://www.uvm.edu/~epscor/jwplayer.php?video=video/2_6_2016_21_Scott%20Merrill-19.mp4

Wiltshire, S., Logan, K., Merrill, S. C., Fooks, J. Koliba, C. J. (2015) Policy Implications from a Social Learning Economics Experiment Addressing Dairy Farm Rotational Grazing. American Society for Public Administration, March 6-10, 2015 Chicago IL

Merrill, S. C., (2014) The value of simulations: *Bt* Corn and the European corn borer. Ecology, Evolution, and Environmental Biology Talk. University of Vermont

Merrill, S. C., Tewksbury, J.J., Deustch, C. A., Battisti, D. S., Naylor, R. L. (2012) Using relationships between temperature, metabolism and consumption to predict the effects of climate change on pest pressure. Invited symposium. Entomological Society of America Annual Meeting. November. Knoxville, TN

Merrill, S. C., Tewksbury, J.J., Deustch, C. A., Battisti, D. S., Naylor, R. L. (2012) Using relationships between temperature, metabolism, and consumption to predict damage from pests in our changing climate. Plant and Soil Science Weekly Seminar Series

Oral Presentations – Continued

Merrill, S. C. (2012) Predicting the effects of climate change on agricultural pest incidence: How secure is our food supply? Invited seminar for the Interdisciplinary Climate Change Seminar series. University of Idaho. March 2012. Moscow, ID

Battisti, D. S., Tewksbury, J. J. Deutsch, C. A., Merrill, S. C., and Naylor, R. L. (2012) Heat and Insect Pest Pressures on Global Food Production due to Global Warming. Planet Under Pressure conference. March 2012. London, UK

Merrill, S. C. (2011) A Series of Surprises: Modelling the Pest Agroecosystem Landscape. Commonwealth Scientific and Industrial Research Organization (CSIRO) Brisbane. June 2011. Brisbane, Australia

Merrill, S. C. (2011) Revisiting our assumptions about the pest agroecosystem landscape. NCEAS (National Center for Ecological Analysis and Synthesis) Ecolunch Seminar Series. June 2011. Santa Barbara, CA

Merrill, S. C. (2010) Understanding the link between Precision Agriculture and Landscape Ecology. NCEAS (National Center for Ecological Analysis and Synthesis) Ecolunch Seminar Series. April 2010. Santa Barbara, CA

Merrill, S. C. (2006) Modeling the Spatial and Temporal Variation of Russian Wheat Aphid, *Diuraphis Noxia* (Homoptera: Aphididae) Overwintering Densities in a Colorado Cropping System. Proceedings of the Entomological Society of America. Entomological Society of America Meeting. December 2006. Cincinnati, OH

Merrill, S. C. (2005) Modeling overwintering densities of Russian wheat aphids. Department of Bioagricultural Sciences and Pest Management Seminar series. Colorado State University. November. Fort Collins, CO

Merrill, S. C. (2005) Modeling overwintering Russian wheat aphid densities in a cropping system in Colorado. Proceedings of the International Association of Landscape Ecologists. IALE Meeting March 2005. Syracuse, NY

Merrill, S. C., T. O. Holtzer, F. B. Peairs, and J. E. Cipra (2004) Modeling spatial and temporal densities of the Russian wheat aphid. Proceedings of the Ecological Society of America. Ecological Society of America Meeting 2004. Portland, OR

Poster Presentations

Merrill, S. C. and F. B. Peairs (2011) The perils of linear thinking: modeling the effects of climate change on insect pest dynamics. Entomological Society of America Annual Meeting. November. Reno, NV

Randolph, T. L., C. Walker, S. C. Merrill, M. Koch and F. B. Peairs (2011) Regulation of Russian wheat aphid (*Diuraphis noxia*) populations with natural enemies present in the wheat system. Entomological Society of America Annual Meeting. November. Reno, NV

Poster Presentations - Continued

Merrill, S. C. and F. B. Peairs (2010) How will climate change affect the risk of crop infestation by the Russian wheat aphid. USDA-Agriculture & Food Research Initiative. Arthropods & Nematodes Biology & Management Programs Awardee Workshop. December. San Diego, CA

Merrill, S. C. and F. B. Peairs (2010) How will climate change affect the risk of crop infestation by the Russian wheat aphid. Entomological Society of America Annual Meeting. December. San Diego, CA

Merrill, S. C. and F. B. Peairs (2010) Developing Outbreak Prediction Models to Improve Russian Wheat Aphid Pest Management Strategy. USDA-Agriculture & Food Research Initiative. Arthropods & Nematodes Biology & Management Programs Awardee Workshop. March. Washington, DC

Merrill, S. C. (2006) Developing Site-Specific Insect Management Zones, Loss Factors, and Economic Injury Levels for Economically Important Pests of Corn in Colorado. Proceedings of the Eighth International Conference on Precision Agriculture and Other Precision Resources Management. Eighth International Conference on Precision Agriculture and Other Precision Resources Management. July. Minneapolis, MN

Merrill, S. C., P. J. Lester, T. O. Holtzer, J. E. Cipra, F. B. Peairs and J. Norman (2003) Modeling overwintering success of the Russian wheat aphid. Proceedings of the International Association of Landscape Ecologists. IALE Meeting April 2003. Banff, Canada

Podcast Presentations

Merrill, S. C. (2011) Could Organic Farming Threaten Our Food Supply? Host: Ranganathan, J. on Curiouser and Curiouser. Miller-McCune. <http://www.miller-mccune.com/curiouser/could-organic-farming-threaten-our-food-supply-34734/>