

# CHARLES D. CANHAM

Cary Institute of Ecosystem Studies  
Box AB; Route #44A  
Millbrook, NY 12545-0129  
Telephone: (914) 677-5343 – FAX: (914) 677-5976  
E:mail: [canhamc@caryinstitute.org](mailto:canhamc@caryinstitute.org)

## Education:

Ph.D. Ecology and Evolutionary Biology, Cornell University. 1984.  
M.S. Botany, University of Wisconsin (Madison). 1978.  
B.S. Botany, Montana State University. 1975.

## Professional Positions:

2004 - Senior Scientist, Cary Institute of Ecosystem Studies  
1997 - 2004 Scientist, Institute of Ecosystem Studies  
1991 - 1997 Associate Scientist, Institute of Ecosystem Studies  
1985 - 1991 Assistant Scientist, Institute of Ecosystem Studies, New York Botanical Garden  
1990 - 2001 Adjunct Associate Professor, Ecology and Evolutionary Biology, University of Connecticut, Storrs, CT  
2001 - Adjunct Professor, Ecology and Evolutionary Biology, University of Connecticut, Storrs, CT  
1984 - 1985 Postdoctoral Research Associate, Institute of Ecosystem Studies, New York Botanical Garden, Millbrook, NY  
1980 - 1982 Teaching Assistant, Section of Ecology and Systematics, Cornell University, Ithaca, NY

## Research Interests:

Development and application of SORTIE-ND – a spatially-explicit model for the neighborhood dynamics of forest ecosystems; neighborhood models of effects of competition and climate on tree growth and mortality; sustainable forestry; effects of wind disturbance on temperate and tropical forests; effects of vertebrate consumers on forest dynamics; linkages between tree population dynamics and forest ecosystem processes; spatially explicit models of linkages between watershed characteristics and lake ecosystem properties; likelihood estimation methods and modeling.

## Selected Publications (past 10 years):

Finzi A. C. and C. D. Canham 2000. Sapling growth in response to light and nitrogen availability in a southern New England forest. *Forest Ecology And Management* 131:153-165

Lepage, P. T., C. D. Canham, K. D. Coates, and P. Bartemucci. 2000. Seed source versus substrate limitation of seedling recruitment in northern temperate forests of British Columbia. *Canadian Journal of Forest Research* 30:415-427.

Knapp, L. B. and C. D. Canham. 2000. Invasion of old-growth forests by *Ailanthus altissima*: sapling growth and recruitment in canopy gaps. *Journal of the Torrey Botanical Society* 127:307-315.

- Wright, E. F., C. D. Canham, and K. D. Coates. 2000. Effects of suppression and release on sapling growth for eleven tree species of northern, interior British Columbia. *Canadian Journal of Forest Research* 30:1571-1580.
- Canham, C. D., Papaik, M. J., and Latty, E. F. 2001. Interspecific variation in susceptibility to windthrow as a function of tree size and storm severity for northern temperate tree species. *Canadian Journal of Forest Research* 31:1-10.
- Dubé, P., M.-J. Fortin, C.D. Canham and D.J. Marceau. 2001. Quantifying gap dynamics and spatio-temporal structures in spatially-explicit models of temperate forest ecosystems. *Ecological Modeling* 142 (1-2): 39-60.
- Manson, R.H., R.S. Ostfeld, and C.D. Canham. 2001. Net effects of rodent herbivores on tree invasion dynamics along forest-field edges. *Ecology* 82 (12): 3320-3329.
- Ostfeld, R. S., E. M. Schaubert, C. D. Canham, F. Keesing, C. G. Jones, and J. O. Wolff. 2001. Effects of acorn production and mouse abundance on abundance and *Borrelia burgdorferi* infection prevalence of nymphal *Ixodes scapularis* ticks. *Vector Borne and Zoonotic Diseases* 1:55-63.
- Bigelow, S. W., and C. D. Canham. 2002. Edaphic effects on growth and distribution of juvenile canopy trees in northeastern USA. *Journal of Ecology* 90:188-200.
- Schnurr, J. L., R. S. Ostfeld, and C. D. Canham. 2002. Direct and indirect effects of masting on rodent populations and tree seed survival. *Oikos* 96:402-410.
- Beaudet, M., C. Messier, and C. D. Canham. 2002. Predictions of understory light conditions in northern hardwood forests following parameterization, sensitivity analysis, and tests of the SORTIE light model. *Forest Ecology and Management* 165:231-244.
- Menard, A., P. Dube, A. Bouchard, C. D. Canham, and D. J. Marceau. 2002. Evaluating the potential of the SORTIE forest succession model for spatio-temporal analysis of small-scale disturbances. *Ecological Modelling* 153:81-96.
- Tripler, C. E., C. D. Canham, R. S. Inouye, and J. L. Schnurr. 2002. Soil nitrogen availability, plant luxury consumption, and herbivory by white-tailed deer. *Oecologia* 133:517-524.
- Uriarte, M, C. D. Canham, and R. B. Root. 2002. A model of simultaneous evolution of competitive ability and herbivore resistance in a perennial plant. *Ecology* 83:2649-2663.
- Latty, E. F., C. D. Canham, and P. L. Marks. 2003. Beech bark disease in northern hardwood forests: The importance of nitrogen dynamics and forest history for disease incidence. *Canadian Journal of Forest Research* 33:257-268.
- Canham, C. D., J. S. Cole, and W. K. Lauenroth (eds.). 2003. *Models in Ecosystem Science*. Princeton University Press, Princeton.
- Canham, C. D., J. S. Cole, and W. K. Lauenroth. 2003. The role of models in ecosystem science. pp 1-12 in Canham, C. D., J. S. Cole, and W. K. Lauenroth (eds.). *Models in Ecosystem Science*. Princeton University Press, Princeton.
- Coates, K. D., C. D. Canham, M. Beaudet, D. L. Sachs, and C. Messier. 2003. Use of a spatially explicit individual-tree model (SORTIE/BC) to explore the implications of patchiness in structurally complex forests. *Forest Ecology and Management* 186:297-310.

- Canham, C. D., P. T. LePage, and K. D. Coates. 2004. A neighborhood analysis of canopy tree competition: effects of shading versus crowding. *Canadian Journal of Forest Research* 34:778-787.
- Canham, C. D. 2004. Neatness is not a virtue. pp. 20-24 in J. C. Purinton, (ed.) *Voices of the Land*. Chelsea Green Publishing, White River Junction, Vermont.
- Latty, E. F., C. D. Canham, and P. L. Marks. 2004. The effects of land-use history on soil properties and nutrient dynamics in northern hardwood forests of the Adirondack Mountains. *Ecosystems* 7:193-207.
- Schnurr, J. L., C. D. Canham, R. S. Ostfeld, and R. S. Inouye. 2004. Neighborhood analyses of small-mammal dynamics: Impacts on seed predation and seedling establishment. *Ecology* 85:741-755.
- Uriarte, M., R. Condit, C. D. Canham, and S. P. Hubbell. 2004. A spatially explicit model of sapling growth in a tropical forest: does the identity of neighbours matter? *Journal of Ecology* 92:348-360.
- Canham, C. D., M. L. Pace, M. J. Papaik, A. G. B. Primack, K. M. Roy, R. J. Maranger, R. P. Curran, and D. M. Spada. 2004. A spatially-explicit watershed-scale analysis of dissolved organic carbon in Adirondack lakes. *Ecological Applications* 14:839-854.
- Gratzer, G., C. Canham, U. Dieckmann, A. Fischer, Y. Iwasa, R. Law, M. J. Lexer, H. Sandmann, T. Spies, B. Splechtna, and J. Szwagrzyk. 2004. Spatio-temporal development of forests – current trends in field studies and models. *Oikos* 107:3-15.
- Greene, D. F., C. D. Canham, K. D. Coates, and P. T. LePage. 2004. An evaluation of alternative dispersal functions for trees. *Journal of Ecology* 92:758-766.
- Uriarte, M., C. D. Canham, J. Thompson, and J. K. Zimmerman. 2004. A maximum-likelihood, neighborhood analysis of tree growth and survival in a tropical forest. *Ecological Monographs* 74:591-614.
- Uriarte, M., C. D. Canham, J. Thompson, J. K. Zimmerman, and N. Brokaw. 2005. Seedling recruitment in a hurricane-driven tropical forest: light limitation, density-dependence and the spatial distribution of parent trees. *Journal of Ecology* 93:291-304.
- Canham, C. D. and M. Uriarte. 2006. Analysis of neighborhood dynamics of forest ecosystems using likelihood methods and modeling. *Ecological Applications* 16:62-73.
- Canham, C. D., M. Papaik, M. Uriarte, W. McWilliams, J. C. Jenkins, and M. Twery. 2006. Neighborhood analyses of canopy tree competition along environmental gradients in New England forests. *Ecological Applications* 16:540-554.
- Coomes, D. A., R. B. Allen, W. A. Bentley, L. E. Burrows, C. D. Canham, L. Fagan, D. M. Forsyth, A. Gaxiola-Alcantar, R. L. Parfitt, W. A. Ruscoe, D. A. Wardle, D. J. Wilson, and E. F. Wright. 2005. The hare, the tortoise and the crocodile: the ecology of angiosperm dominance, conifer persistence and fern filtering. *Journal of Ecology* 93:918-935.
- Gravel, D., C. D. Canham, M. Beaudet, and C. Messier. 2006. Reconciling niche and neutrality: the continuum hypothesis. *Ecology Letters* 9:399-409.

- Lovett, G. M., C. D. Canham, M. A. Arthur, K. C. Weathers, and R. D. Fitzhugh. 2006. Forest ecosystem responses to exotic pests and pathogens in eastern North America. *Bioscience* 56: 395-405.
- Maranger, R. C. D. Canham, M. L. Pace, and M. J. Papaik. 2006. A spatially explicit model of iron loading to lakes. *Limnology and Oceanography* 51:247-256.
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- Papaik, M. J., C. D. Canham, E. F. Latty, and K. D. Woods. 2005. Effects of an introduced pathogen on resistance to natural disturbance: beech bark disease and windthrow. *Canadian Journal of Forest Research* 35:1832-1843.
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- Papaik, M. J. and C. D. Canham. 2006. Tree competition along environmental gradients in southern New England forests: An application of multi-model inference. *Ecological Applications*, 16: 1880-1892.

- Wilson, D. J., E. F. Wright, C. D. Canham, and W. A. Ruscoe. 2007. Neighbourhood analyses of tree seed predation by introduced rodents in a New Zealand temperate rainforest. *Ecography* **30**:105-119.
- Bigelow, S. W. and C. D. Canham. 2007. Nutrient limitation of juvenile trees in a northern hardwood forest: Calcium and nitrate are preeminent. *Forest Ecology and Management*, **243**:310-319.
- Gómez-Aparicio, L. and C. D. Canham. 2008. Neighborhood models of the effects of invasive tree species on ecosystem processes. *Ecological Monographs* **78**:69-86.
- Gómez-Aparicio, L. and C. D. Canham. 2008. A neighborhood analysis of the allelopathic effects of the invasive tree *Ailanthus altissima* in temperate forests. *Journal of Ecology* **96**:447-458.
- Gómez-Aparicio, L., C. D. Canham, and P. H. Martin. 2008. Neighborhood models of the effects of the invasive *Acer platanoides* on tree seedling dynamics: linking impacts on communities and ecosystems. *Journal of Ecology* **96**:78-90.
- Martin, P. H., C. D. Canham, and P. L. Marks. 2008. Why forests appear resistant to exotic plant invasions: intentional introductions, stand dynamics, and the role of shade tolerance. *Frontiers in Ecology and the Environment* **3**:142-149.
- Busby, P. E., C. D. Canham, G. Motzkin, and D.R. Foster. 2009. Forest response to chronic hurricane disturbance in coastal New England. *Journal of Vegetation Science* **20**:487-497.
- Canham, C. D. 2009. Adirondack upland forests. Contributed chapter for “The Great Experiment in Conservation: Voices from the Adirondack Park”, edited by W. F. Porter, R. S. Whaley, and J. D. Erickson. Syracuse University Press.
- Canham, C. D. and M. L. Pace. 2009. A spatially-explicit, mass-balance analysis of watershed-scale controls on lake chemistry. Contributed chapter for “Real World Ecology: Large-Scale and Long-Term Case Studies and Methods”, edited by S. Miao, M. Nungesser, and S. Carstenn. Springer-Verlag.
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- Comita, L. S., M. Uriarte, J. Thompson, I. Jonckheere, C. D. Canham, and J. K. Zimmerman. 2009. Abiotic and biotic drivers of seedling survival in a hurricane-impacted tropical forest. *Journal of Ecology* **97**:1346-1359.
- Coomes, D. A., G. Kunstler, C. D. Canham, and E. Wright. 2009. A greater range of shade-tolerance niches in nutrient-rich forests: an explanation for positive richness-productivity relationships? *Journal of Ecology* **97**:705-717.

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- Uriarte, M., C. D. Canham, J. Thompson, J. K. Zimmerman, L. Murphy, A. M. Sabat, N. Fetcher, and B. L. Haines. 2009. Natural disturbance and human land use as determinants of tropical forest dynamics: results from a forest simulator. *Ecological Monographs* 79:423-443.
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- Canham, C. D., J. Thompson, J. K. Zimmerman, and M. Uriarte. 2010. Variation in Susceptibility to Hurricane Damage as a Function of Storm Intensity in Puerto Rican Tree Species. *Biotropica* 42:87-94.
- Gravel, D., C. D. Canham, M. Beaudet, and C. Messier. 2010. Shade tolerance, canopy gaps and mechanisms of coexistence of forest trees. *Oikos* 119:475-484.
- Martin, P. H. and C. D. Canham. 2010. Dispersal and recruitment limitation in native versus exotic tree species: life-history strategies and Janzen-Connell effects. *Oikos* 119:807-824.
- Martin, P. H., C. D. Canham, and R. K. Kobe. 2010. Divergence from the growth-survival trade-off and extreme high growth rates drive patterns of exotic tree invasions in closed-canopy forests. *Journal of Ecology* 98:778-789.
- Thomas, R. Q., C. D. Canham, K. C. Weathers, and C. L. Goodale. 2010. Increased tree carbon storage in response to nitrogen deposition in the US. *Nature Geoscience* 3:13-17.
- Canham, C. D. and R. Q. Thomas. 2010. Frequency, not relative abundance, of temperate tree species varies along climate gradients in eastern North America. *Ecology* 91:3433-3440.
- Comita, L. S., J. Thompson, M. Uriarte, I. Jonckheere, C. D. Canham, and J. K. Zimmerman. 2010. Interactive effects of land use history and natural disturbance on seedling dynamics in a subtropical forest. *Ecological Applications* 20:1270-1284.
- Katz, D. S. W., G. M. Lovett, C. D. Canham, and C. M. O'Reilly. 2010. Legacies of land use history diminish over 22 years in a forest in southeastern New York. *Journal of the Torrey Botanical Society* 137:236-251.
- Busby, P. E. and C. D. Canham. 2011. An exotic insect and pathogen disease complex reduces aboveground tree biomass in temperate forests of eastern North America. *Canadian Journal of Forest Research-Revue Canadienne De Recherche Forestiere* 41:401-411.