

## SUMMARY CURRICULUM VITAE

[Robert J. Mitchell PhD.](#)

Scientist



Dr. Mitchell's interests include the ecophysiological limits to productivity, particularly below ground, and how natural disturbance processes can be incorporated into silviculture to conserve southern pine grasslands. We have pioneered the incorporation of root order and mycorrhizae into a better understanding of how below ground processes regulate carbon and nutrient cycling. With Dr. Jerry Franklin of the University of Washington and Brian Palik of the USFS, he has developed a network of training workshops throughout the country for professional land managers on ecological forestry. Dr. Mitchell has assisted in advisory groups for

conservation management and has participated in regional, national and international forums on how forests can be managed in ways that produce timber wildlife but conserve native diversity.

### Education:

PhD in Forestry, University of Missouri, 1984

MS in Forestry, Southern Illinois University, 1980

BS in Forestry, Southern Illinois University, 1979

### Professional Experience:

1999-present: Scientist, J. W. Jones Ecological Research Center

#### Adjunct faculty positions

- Auburn University
- University of Georgia
- University of Florida
- Virginia Polytechnic Institute and State University

1992-1999. Associate Scientist, J. W. Jones Ecological Research Center

1990-1992. Associate Professor (tenured), Auburn University, and School of Forestry

1986-1990. Assistant Professor, Auburn University, School of Forestry

Recent Research Publications: (Past 5 years)

- Hiers, J. K., J. J. O'Brien, R. J. Mitchell, J. M. Greggo, and E. L. Loudermilk. 2009. The fuel cell concept: characterizing fine-scale variation in fuels and fire in frequently burned longleaf pine forests. *International Journal of Wildland Fire* (In press).
- Loudermilk, E. L., J. K., Hiers, J. J. O'Brien, R. J. Mitchell, A. Singhanian, J. C. Fernandez, W. P. Cropper, and K. C. Slatton. 2009. Ground-based LIDAR: a novel approach to quantify fine-scale fuelbed characteristics. *International Journal of Wildland Fire* (In press).
- Mitchell, R. J., and S. Duncan. 2009. Southern Coastal Plain forests and range of variability: its historical, contemporary, and future role in sustaining biodiversity. *Ecology and Society* (In press).
- Ford, C. R., R. J. Mitchell, and R. O. Teskey. 2008. [Water table depth affects productivity, water use, and the response to nitrogen addition in a savanna system.](#) *Canadian Journal of Forest Research* 38:2118-2127. Reproduced with permission of the National Research Council Press © 2008.
- Guo, D., H. Li, R. J. Mitchell, W. Han, J. J. Hendricks, T. J. Fahey, and R. J. Hendricks. 2008. Fine root heterogeneity by branch order: exploring the discrepancy in root turnover estimates between minirhizotron and carbon isotopic methods. *New Phytologist* 177:443-456.
- Guo, D., R. J. Mitchell, J. M. Withington, P. P. Fan, and J. J. Hendricks. 2008. Endogenous and exogenous controls of root life span, mortality and nitrogen flux in a longleaf pine forest: root branch order predominates. *Journal of Ecology* 96:737-745.
- McIntyre, R. K., S. B. Jack, R. J. Mitchell, J. K. Hiers, and W. L. Neel. 2008. Multiple Value Management: The Stoddard-Neel Approach to Ecological Forestry in Longleaf Pine Grasslands. Miscellaneous publication of the J. W. Jones Ecological Research Center.
- O'Brien, J. J., J. K. Hiers, M. A. Callahan, Jr., R. J. Mitchell, and S. B. Jack. 2008. Interactions among overstory structure, seedling life-history traits, and fire in frequently burned neotropical pine forests. *Ambio* 37:542-547.
- Hiers, J. K., and R. J. Mitchell. 2007. The influence of burning and light availability on N<sub>2</sub>-fixation of native legumes in longleaf pine savannas. *Journal of the Torrey Botanical Society* 134:398-409.
- Hiers, J. K., J. J. O'Brien, R. E. Will, and R. J. Mitchell. 2007. [Forest floor depth mediates understory vigor in xeric \*Pinus palustris\* ecosystems.](#) *Ecological Applications* 17:806-814. Reproduced with permission of the Ecological Society of America © 2007.

- Kirkman, L. K., R. J. Mitchell, M. J. Kaeser, S. D. Pecot, and K. L. Coffey. 2007. The perpetual forest: using undesirable species to bridge restoration. *Journal of Applied Ecology* 44:604-614.
- Pecot, S. D., R. J. Mitchell, B. J. Palik, E. B. Moser, and J. K. Hiers. 2007. [Competitive responses of seedlings and understory plants in longleaf pine woodlands: separating canopy influences above and below ground.](#) *Canadian Journal of Forest Research* 37:634-648. Reproduced with permission of the National Research Council Press © 2007.
- Sims, S. E., J. J. Hendricks, R. J. Mitchell, K. A. Kuehn, and S. D. Pecot. 2007. Nitrogen decreases and precipitation increases ectomycorrhizal extramatrical mycelia production in longleaf pine forest. *Mycorrhiza* 17:299-309.
- Addington, R. N., L. A. Donovan, R. J. Mitchell, J. M. Vose, S. D. Pecot, S. B. Jack, U.G. Hacke, J. S. Sperry, and R. Oren. 2006. Adjustments in hydraulic architecture of *Pinus palustris* maintain similar stomatal conductance in xeric and mesic habitats. *Plant, Cell and Environment* 29:535-545.
- Hendricks, J. J., R. L. Hendrick, C.A. Wilson, R. J. Mitchell, S. D. Pecot, and D. Guo. 2006. Assessing the patterns and controls of fine root dynamics: an empirical test and methodological review. *Journal of Ecology* 94:40-57.
- Hendricks, J. J., R. J. Mitchell, K. A. Kuehn, S.D. Pecot, and S. E. Sims. 2006. Measuring external mycelia production of ectomycorrhizal fungi in the field: the soil matrix matters. *New Phytologist* 171:179-186.
- Kirkman, L. K., and R. J. Mitchell. 2006. Conservation management of *Pinus palustris* ecosystems from a landscape perspective. *Applied Vegetation Science* 9:67-74.
- Mitchell, R. J., J. K. Hiers, J. J. O'Brien, S. B. Jack, and R. T. Engstrom. 2006. [Silviculture that sustains: the nexus between silviculture, frequent prescribed fire, and conservation of biodiversity in longleaf pine forests of the southeastern United States.](#) *Canadian Journal of Forest Research* 36:2724-2736. Reproduced with permission of the National Research Council Press © 2006.
- Runion, G. B., M. A. Davis, S. G. Pritchard, S. A. Prior, R. J. Mitchell, H.A. Torbert, H. H. Rogers, and R. R. Dute. 2006. Effects of elevated atmospheric carbon dioxide on biomass and carbon accumulation in a model regenerating longleaf pine community. *Journal of Environmental Quality* 35:1478-1486. [This document may be obtained from the publisher's website.](#)

- Schulte, L. A., R. J. Mitchell, M.L. Hunter, Jr., J. F. Franklin, R. K. McIntyre, and B. J. Palik. 2006. Evaluating the conceptual tools for forest biodiversity conservation and their implementation in the U.S. *Forest Ecology and Management* 232:1-11.
- Cheng, W., F. Shenglei, R. B. Susfalk, and R. J. Mitchell. 2005. Measuring tree root respiration using  $^{13}\text{C}$  natural abundance: rooting medium matters. *New Phytologist* 167:297-307.
- Ford, C. R., C. E. Goranson, R. J. Mitchell, R. E. Will, and R. O. Teskey. 2005. Modeling canopy transpiration using times series analysis: A case study illustrating the effect of soil moisture deficit on *Pinus taeda*. *Agricultural and Forest Meteorology* 130:163-175.
- Pecot, S. D., S. B. Horsley, M. A. Battaglia, and R. J. Mitchell. 2005. [The influence of canopy, sky condition, and solar angle on light quality in a longleaf pine woodland](#). *Canadian Journal of Forest Research* 35:1356-1366. Reproduced with permission of the National Research Council Press © 2005.
- Addington, R. N., R. J. Mitchell, R. Oren, and L. A. Donovan. 2004. Stomatal sensitivity to vapor pressure deficit and its relationship to hydraulic conductance in *Pinus palustris*. *Tree Physiology* 24:561-569.
- Boring, L. R., C. A. Wilson, J. J. Hendricks, and R. J. Mitchell. 2004. Season of burn and nutrient losses in a longleaf pine ecosystem. *International Journal of Wildland Fire* 13:443-453.
- Carter, D. C., J. J. Hendricks, R. J. Mitchell, and S. D. Pecot. 2004. Fine root carbon allocation and fates in longleaf pine forests. *Forest Science* 50:177-187.
- Ford, C. R., C. E. Goranson, R. J. Mitchell, R. E. Will, and R. O. Teskey. 2004. Diurnal and seasonal variability in the radial distribution of sap flow: predicting total stem flow in *Pinus taeda* trees. *Tree Physiology* 24:951-960.
- Ford, C. R., M. A. McGuire, R. J. Mitchell, and R. O. Teskey. 2004. Assessing variation in the radial profile of sap flux density in *Pinus* species and its effect on daily water use. *Tree Physiology* 24:241-249.
- Guo, D., P. Mou, R. H. Jones, and R. J. Mitchell. 2004. Spatio-temporal patterns of soil available nutrients following experimental disturbance in a pine forest. *Oecologia* 138:613-621.
- Guo, D. L., R. J. Mitchell, and J. J. Hendricks. 2004. Fine root branch orders respond differentially to carbon source-sink manipulations in a longleaf pine forest. *Oecologia* 140:450-457.

- Hendricks, J. J., R. J. Mitchell, K. M. Green, T. L. Crocker, and J. G. Yarbrough. 2004. Assessing the nitrogen-15 concentration of plant-available soil nitrogen. *Communications in Soil Science and Plant Analysis* 35:1207-1217.
- Kirkman, L. K., K. L. Coffey, R. J. Mitchell, and E. B. Moser. 2004. Ground cover recovery patterns and life-history traits: implication for restoration obstacles and opportunities in a species-rich savanna. *Journal of Ecology* 92:409-421.
- Battaglia, M. A., R. J. Mitchell, P. P. Mou, and S. D. Pecot. 2003. Light transmittance estimates in a longleaf pine woodland. *Forest Science* 49:752-762.
- Hiers, J. K., R. J. Mitchell, L. R. Boring, J. J. Hendricks, and R. Wyatt. 2003. Legumes native to longleaf pine savannas exhibit capacity for high N<sub>2</sub>-fixation rates and negligible impacts due to timing of fire. *New Phytologist* 157:327-338.
- Jones, R. H., R. J. Mitchell, G. N. Stevens, and S. D. Pecot. 2003. Controls of fine root dynamics across a gradient of gap sizes in a pine woodland. *Oecologia* 134:132-143.
- Palik, B. J., R. J. Mitchell, S. D. Pecot, M. Battaglia, and P. Mou. 2003. [Spatial distribution of overstory retention influences resources and growth of longleaf pine seedlings.](#) *Ecological Applications* 13:674-686. Reproduced with permission of the Ecological Society of America © 2003.

#### Outreach Publications and Reports to Natural Resource Agencies: (Past 5 years)

- Franklin, J. F., R. J. Mitchell, and B. J. Palik. 2007. [Natural disturbance and stand development principles of ecological forestry.](#) USDA Forest Service, Northern Research Station, Newtown Square, Pennsylvania. 48 p.
- Mitchell, R. J., J. K. Hiers, R. T. Engstrom, L. K. Kirkman, J. Hill, R. T. Sharitz, and R. Cooper. 2006. Report to the National Council of Science and Sustainable Forestry on Old-Growth Forests and Conservation of biodiversity of the Southeast.
- Schulte, L. A., R. J. Mitchell, M. L. Hunter, Jr., J. F. Franklin, R. K. McIntyre, and B. J. Palik. 2004. Evaluating the conceptual tools for forest biodiversity conservation. Final Report to NCSSF.

#### Current Jones Center Research:

Productivity and Biodiversity Patterns: Controls in a Southeastern Coastal Plain Landscape.

Silviculture that Sustains and Restores Native Biodiversity of Pinelands in the Southeastern Coastal Plain: Legacies, Fire and Recovery Periods.

External Grants and Contracts (past 5 years):

USDA NRI Managed Ecosystems. The Influence of Carbon Sinks and Sources on Root and Mycorrhizal Dynamics. \$440 k. Mitchell, R. J., J. J. Hendricks, K. A. Kuehn, and J. J. O'Brien. 2006-2007.

National Commission on Science for Sustainable Forestry. Old Growth Forest and Conservation in the Southeastern US. \$30 k. Mitchell, R. J. 2006.

National Commission on Science for Sustainable Forestry "Calibrating Conservation Theory with Practice". \$100 k. Mitchell, R. J., R. K. McIntyre, B. J. Palik, M. L. Hunter, Jr., and J. F. Franklin. 2003-2004.

Doris Duke Foundation "Lowcountry Forest Conservation Project". Jones Center amount \$117 k. McIntyre K., R. J. Mitchell, and S. B. Jack. 2003-2006.

USDA Forest Service/Joint Fire Science Program "Duff Consumption and Southern Pine Mortality Soils Work". \$28 k. Mitchell, R. J. 2002-2004.

National Commission on Science for Sustainable Forestry "Natural disturbances as a guide to restoration". \$100 k. Mitchell, R. J., L. K. Kirkman, L. L. Smith, T. Engstrom, B. J. Palik, J. F. Franklin, and M. L. Hunter, Jr. 2002-2003.

Recent Student Advisement:

Noah A. Jansen. 2007. Influence of root branching order on fine root substrate quality and decomposition in a *Pinus palustris* ecosystem. M.S., Thesis, School of Forestry and Conservation, University of Florida, Gainesville, FL. (Co-advisor with Dr. Jose Shibu).

Cheley R. Ford. 2004. Variable distributions of water as a transpiration source: consequences from the tree stem to ecosystem functioning. Ph.D., Warnell School of Forest Resources, University of Georgia, Athens, GA. (Co-advisor with Dr. Bob Teskey).

Robert N. Addington. 2001. Water use patterns and stomatal responses to environment in longleaf pine on contrasting sites. M.S., Botany Dept., University of Georgia, Athens GA. (Co-advisor with Dr. Lisa Donovan).

Kristin M. Bliss. 2001. Impact of nutrient heterogeneity on plant response and competition in Coastal plain species. Ph.D., Biology Dept., Virginia Polytechnic Institute and State University, Blacksburg, VA. (Co-advisor with Dr. Bob Jones).

Durwin C. Carter. 2001. Carbon-fine root allocation and transfer at ecosystem scales (C-FATES). M.S., Biology Dept., State University of West Georgia, Carrollton, GA. (Co-advisor with Dr. Joe Hendricks).

Glen N. Stevens. 2001. Fine root dynamics in a *Pinus palustris* Mill. ecosystem: the role of sampling interval and the soil environment. M.S., Virginia Polytechnic Institute and State University, Blacksburg, VA. (Co-advisor with Dr. Bob Jones).