**Dr. Matthew Langholtz**

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**Education and Training**

University of Florida Forest Economics Ph.D. 2005

University of Florida Agroforestry Masters 2000

Oklahoma State University Forestry B.S. 1994

**Professional Experience**

2010-Present P.I, BETO Supply Forecasting and Analysis Project; Team Lead, Bioenergy Resource and Engineering Systems; Natural Resource & Environmental Economist, Oak Ridge National Lab.

2007-2010 Project Director, BioResource Management, Gainesville, FL.

2009 Co-instructor, Introduction to Natural Resource and Environmental Economics. University of Florida, Gainesville, FL.

2005-2007 Postdoctoral Research Associate, University of Florida, Gainesville, FL.

1998 W.M. Beaty & Associates, Inc., Susanville, CA.

1997-1998 Environment Sector Coordinator, Peace Corps, Asunción, Paraguay.

1994-1996 Agroforestry Field Extension Agent, Peace Corps, Rural Paraguay.

**Refereed Publications**

**Langholtz M**, Davis M, Eaton L, Hilliard M, Brandt C, Webb E, et al. 2022. "Nth-plant supply: corn stover supplies and costs in a fleet of biorefineries." Biofuels, Bioproducts and Biorefining 16 (1):204-218. doi: <https://doi.org/10.1002/bbb.2305>.

Kasturi, A.; Yiacoumi, S.; **Langholtz, M.**; McFarlane, J.; Busch, I.; Hilliard, M.; Tsouris, C. Comparison of Long-Term Bioenergy with Carbon Capture and Storage to Reference Power Generation Technologies Using CO2 Avoidance Cost in the U.S. Energies 2021, 14, 7026. <https://doi.org/10.3390/en14217026>

Hossain T, Jones D, Hartley D, Griffel LM, Lin Y, Burli P, et al. 2021. "The nth-plant scenario for blended feedstock conversion and preprocessing nationwide: Biorefineries and depots." Applied Energy 294:116946. doi: <https://doi.org/10.1016/j.apenergy.2021.116946>

Oyedeji O, **Langholtz M**, Hellwinckel C, Webb E. 2021. "Supply analysis of preferential market incentive for energy crops." Biofuels, Bioproducts and Biorefining. <https://doi.org/10.1002/bbb.2184>.

**Langholtz M,** Davison BH, Jager HI, Eaton L, Baskaran LM, Davis M, et al. 2021. "Increased nitrogen use efficiency in crop production can provide economic and environmental benefits." Sci Total Environ 758:143602. <https://doi.org/10.1016/j.scitotenv.2020.143602>

**Langholtz, M.**; Busch, I.; Kasturi, A.; Hilliard, M.R.; McFarlane, J.; Tsouris, C.; Mukherjee, S.; Omitaomu, O.A.; Kotikot, S.M.; Allen-Dumas, M.R.; DeRolph, C.R.; Davis, M.R.; Parish, E.S. The Economic Accessibility of CO2 Sequestration through Bioenergy with Carbon Capture and Storage (BECCS) in the US. Land 2020, 9, 299. <https://doi.org/10.3390/land9090299>

Davis MR, Kainer D, Tuskan GA, **Langholtz MH**, Hellwinckel CM, Shedden M, et al. 2020. "Modeled economic potential for Eucalyptus spp. production for jet fuel additives in the United States." Biomass and Bioenergy 143. <https://doi.org/10.1016/j.biombioe.2020.105807>.

**Langholtz, M.**, “Economic accessibility of bioenergy with carbon capture and sequestration (BECCS) in the US”, in “Roles of bioenergy in energy system pathways towards a “well-below-2-degrees-Celsius (WB2)” world”, A Strategic Inter-Task Study. Eds: Thran, D., Cowie, A., and Berndes, G. (2020).

Henriette I Jager, Esther S Parish, **Matthew H Langholtz**, Anthony W King, Perennials in Flood-Prone Areas of Agricultural Landscapes: A Climate Adaptation Strategy, BioScience, Volume 70, Issue 4, April 2020, Pages 278–280, <https://doi.org/10.1093/biosci/biaa006>

Sharma, B., Brandt, C., McCullough‐Amal, D., **Langholtz, M.** and Webb, E. (2020), Assessment of the feedstock supply for siting single‐ and multiple‐feedstock biorefineries in the USA and identification of prevalent feedstocks. Biofuels, Bioprod. Bioref., 14: 578-593. doi:10.1002/bbb.2091

Eaton, L., **Langholtz, M.** and Davis, M. (2019), The impact of alternative land and yield assumptions in herbaceous biomass supply modeling: one‐size‐fits‐all resource assessment?. Biofuels, Bioprod. Bioref., 13: 120-128. doi:10.1002/bbb.1946

**Langholtz M**., Eaton L., Davis M, Shedden M, Brandt C, Volk T, Richard T, Economic comparative advantage of willow biomass in the Northeast U.S. Biofuels, Bioproducts, and Biorefining. (accepted). DOI:10.1002/bbb.1939.

**Langholtz, M**. , Eaton, L. , Davis, M. , Hartley, D. , Brandt, C. and Hilliard, M. (2019), Cost and profit impacts of modifying stover harvest operations to improve feedstock quality. Biofuels, Bioprod. Bioref.. doi:10.1002/bbb.2005

Jiang, W. , Jacobson, M. G. and **Langholtz, M. H**. (2019), A sustainability framework for assessing studies about marginal lands for planting perennial energy crops. Biofuels, Bioprod. Bioref., 13: 228-240. doi:10.1002/bbb.1948

U.S. Department of Energy. 2017. 2016 Billion-Ton Report: Advancing Domestic Resources for a Thriving Bioeconomy, Volume 2: Environmental Sustainability Effects of Select Scenarios from Volume 1. R. A. Efroymson, **M. H. Langholtz**, K.E. Johnson, and B. J. Stokes (Eds.), ORNL/TM-2016/727. Oak Ridge National Laboratory, Oak Ridge, TN. 642p. doi 10.2172/1338837

Woodbury, Peter B., Armen R. Kemanian, Michael Jacobson, and **Matthew Langholtz**. 2017. "Improving water quality in the Chesapeake Bay using payments for ecosystem services for perennial biomass for bioenergy and biofuel production." Biomass and Bioenergy. doi: <http://dx.doi.org/10.1016/j.biombioe.2017.01.024>.

**Matthew Langholtz**, Stokes Bryce, and Eaton Laurence. 2016 Billion-Ton Report: Advancing Domestic Resources for a Thriving Bioeconomy (Executive Summary). Industrial Biotechnology. October 2016, 12(5): 282-289. https://doi.org/10.1089/ind.2016.29051.doe.

U.S. Department of Energy. 2016. *2016 Billion-Ton Report: Advancing Domestic Resources for a Thriving Bioeconomy, Volume 1: Economic Availability of Feedstocks*. **M. H. Langholtz**, B. J. Stokes, and L. M. Eaton (Leads), ORNL/TM-2016/160. Oak Ridge National Laboratory, Oak Ridge, TN. 448p.

**Efroymson, Rebecca,** Virginia Dale, Matthew H. Langholtz, Socioeconomic Indicators for Sustainable Production and Use of Algal Biofuels. Global Change Bioenergy. *In review.*

**Langholtz, M**., Andre Coleman, Mark Wigmosta, Laurence Eaton. Langholtz, M., Coleman, A., Eaton, L., Wigmosta, M., Evaluation of Potential Land Competition Between Open-Pond Micro Algae Production and Terrestrial Dedicated Feedstock Supply Systems. Algal Biomass, Biofuels, and Bioproducts. *In review.*

Hellwinckel, Chad, Christopher Clark, **Matthew Langholtz**, and Laurence Eaton. 2015. "Simulated impact of the renewable fuels standard on US Conservation Reserve Program enrollment and conversion." GCB Bioenergy:n/a-n/a. doi: 10.1111/gcbb.12281.

Muth, David J., Jr., **Matthew H. Langholtz**, Eric C. D. Tan, Jacob J. Jacobson, Amy Schwab, May M. Wu, Andrew Argo, Craig C. Brandt, Kara G. Cafferty, Yi-Wen Chiu, Abhijit Dutta, Laurence M. Eaton, and Erin M. Searcy. 2014. "Investigation of thermochemical biorefinery sizing and environmental sustainability impacts for conventional supply system and distributed pre-processing supply system designs." Biofuels Bioproducts & Biorefining-Biofpr 8 (4):545-567. doi: 10.1002/bbb.1483.

**Langholtz, M. H.**, Eaton, L. M., Turhollow, A., & Hilliard, M. R. (2014). 2013 Feedstock Supply and Price Projections and Sensitivity Analysis. Biofuels Bioproducts & Biorefining-Biofpr, 8(4). doi:10.1002/bbb.1489 (lead analyst and author)

Turhollow, Anthony, R.D. Perlack, Laurence M. Eaton, **Matthew H. Langholtz**, Craig C. Brandt, Mark E. Downing, Lynn Wright, Kenneth E. Skog, Chad M. Hellwinckel, Bryce Stokes, and Patricia Lebow. 2014. "The updated billion-ton resource assessment." Biomass and Bioenergy 70:15.

Dale, Virginia H., **Matthew H. Langholtz**, Beau M. Wesh, and Laurence M. Eaton. 2013. "Environmental and Socioeconomic Indicators for Bioenergy Sustainability as Applied to Eucalyptus." International Journal of Forestry Research 2013:10. doi: 10.1155/2012/215276.

Argo, A. M., Tan, E. C., Inman, D., **Langholtz, M. H.**, Eaton, L. M., Jacobson, J. J., … Graham, R. L. (2013). Investigation of biochemical biorefinery sizing and environmental sustainability impacts for conventional bale system and advanced uniform biomass logistics designs. Biofuels, Bioproducts and Biorefining, 7(3), 282–302. doi:10.1002/bbb.1391 (contributed economic analysis of feedstocks)

Clark, C. M., Lin, Y., Bierwagen, B. G., Eaton, L. M., **Langholtz, M. H**., Morefield, P. E., … Bush, B. W. (2013). Growing a sustainable biofuels industry: economics, environmental considerations, and the role of the Conservation Reserve Program. *Environmental Research Letters*, *8*(2), 025016. doi:10.1088/1748-9326/8/2/025016

**Langholtz, Matthew**; Webb, Erin; Preston, Benjamin; Turhollow, Anthony; Breuer, Norman; Eaton, Laurence; King, Anthony; Sokhansanj, Shahabaddine; Nair, Sujithkumar; Downing M. Advancing Climate Risk Management for the U.S. Cellulosic Biofuels Supply Chain. Clim Risk Manag. 1–20. doi:10.1016/j.crm.2014.05.001

**Langholtz, M. H.**, Downing, M. E., Graham, R. L., Baker, F., Compere, A., Griffith, W., … Keller, M. (2014). Lignin-Derived Carbon Fiber as a Co-Product of Refining Cellulosic Biomass. *SAE Int. J. Mater. Manf.*, *7*(4), 115–121. doi:10.4271/2013-01-9092

**Langholtz, M. H.**, & Jacobson, M. (2013). The Economic Availability of Woody Biomass Feedstocks in the Northeast. In M. Jacobson & D. Ciolkosz (Eds.), Wood-Based Energy in the Northern Forests (pp. 27–50). New York, NY: Springer.

Dale, Virginia H., Rebecca A. Efroymson, Keith L. Kline, **Matthew H. Langholtz**, Paul N. Leiby, Gbadebo A. Oladosu, Maggie R. Davis, Mark E. Downing, and Michael R. Hilliard. 2013. "Indicators for assessing socioeconomic sustainability of bioenergy systems: A short list of practical measures." Ecological Indicators 26:87-102. doi: 10.1016/j.ecolind.2012.10.014.

**Langholtz, M.,** Graham, R., Eaton, L., Perlack, R., Hellwinkel, C., De La Torre Ugarte, D., 2012. Price projections of feedstocks for biofuels and biopower in the U.S. Energy Policy.

Webb, Erin, **Matthew H. Langholtz**, et al. Utilizing resources of the Oak Ridge Reservation to promote forest health and supply wood chips to the ORNL biomass steam plant. ORNL/TM-2011/525. Oak Ridge, TN: Oak Ridge National Laboratory.2011.

**Langholtz, Matthew H.**, et al. Demonstration of the BioBaler harvesting system for collection of small-diameter woody biomass. ORNL/TM-2011/524. Oak Ridge, TN: Oak Ridge National Laboratory.2011.

Downing, Mark, **Matthew H. Langholtz** et al. U.S. Billion-Ton Update: Biomass Supply for a Bioenergy and Bioproducts Industry. ORNL/TM-2011/224. Oak Ridge, TN: Oak Ridge National Laboratory.2011.

Turhollow, Anthony, Bob Perlack, **Matthew H. Langholtz** , et al. Energy Crops Cost Database. ORNL/TM-2011/223. Oak Ridge, TN: Oak Ridge National Laboratory.2011.

**Langholtz, M.,** Carter, D., Rockwood, D., Alavalapati, J. R. R., 2009. The Influence of CO2 Mitigation Incentives on Profitability of Eucalyptus Production on Clay Settling Areas in Florida. Biomass and Bioenergy. 33(5), pp. 785-792.

**Langholtz, M.,** Carter, D., Rockwood, D., Alavalapati, J. R. R., 2007. The Economic Feasibility of Reclaiming Phosphate Mined Lands With Short-Rotation Woody Crops in Florida. Journal of Forest Economics. 12, pp. 237-249.

**Langholtz, M**., Carter, D., and Schroeder, R., (In Review) The Economic Availability of Woody Biomass, in Wood to Energy: Utilizing Interface Fuels for Bioenergy, USDA Forest Service GTR-132.

**Langholtz, M.**, Carter, D., Marsik, M., and Schroeder, R., 2006. Application of ArcGIS Network Analyst to Assess the Economic Availability of Renewable Biomass for Energy, ArcUser, Vol. 9, No. 4, October-December Edition, pp. 22-25. Online at http://www.esri.com/news/arcuser/1006/biomass1of2.html.

Rockwood, D., Carter, D., **Langholtz, M.**, Stricker, J., 2006. Eucalyptus and Populus Short Rotation Woody Crops for Phosphate Mined Lands in Florida USA. Biomass and Bioenergy. 30, 8, pp. 728-734.

**Langholtz, M.**, Carter, D., Rockwood, D. L., Alavalapati, J. R. R., Green, A.., 2005. Effect of Dendroremediation Incentives on the Profitability of Short-Rotation Woody Cropping of Eucalyptus grandis. Forest Policy and Economics. 7, 5, pp. 806-817.

**Langholtz, M.**, 2005, Economic and Environmental Analysis of Tree Crops on Marginal Lands in Florida. 1-155, PhD Dissertation, School of Forest Resources and Conservation, University of Florida.

Hodges, A., Degner, R., Carter, D., Stevens, T., **Langholtz, M.**, Morgan, K.. 2005. Market Enhancement for Small Diameter Timber in Florida. University of Florida, IFAS.

Smith, W., Hermansen, A., Najafi, F., Rockwood, D., **Langholtz, M.**, Toros, A., Multidisciplinary Academic Demonstration of a Biomass Alliance with Natural Gas” Proc (2004) ICEE conf. Gainesville FL.

Breuer, N., **Langholtz, M.**, Using Seasonal Climate Variability Forecasts to Plan Forest Plantation Establishment, Florida Cooperative Extension Service Document ABE354, 2004.

**Presentations**

**Matthew Langholtz.** “Biomass Supply, Context for Aviation Fuels” Commercial Aviation Alternative Fuels Initiative - SAF Efforts at INL and ORNL. Nov 17, 2021 - Nov 17, 2021.

**Matthew Langholtz.** Advanced Biofuels Association: Biomass Supply and BECCS Analysis. ABFA, July 15th 2021.

**Matthew Langholtz.** The Economic Accessibility of CO2 Sequestration through Bioenergy with Carbon Capture and Storage (BECCS) in the US. Stanford Global Carbon Management Workshop #2. Jun 07, 2021 - Jun 10, 2021. Stanford, California.

**Matthew H. Langholtz**. “The 2016 Billion-Ton Report, Volume 2: Environmental Sustainability Effects of Select Scenarios from Volume 1”. BioEconomy 2017: Domestic Resources for Vibrant Future. July 11th, 2017. Arlington, Virginia.

**Matthew H. Langholtz**. “The 2016 Billion-Ton Report and influence of key assumptions on feedstock mix”. 29th Symposium on Biotechnology for Fuels and Chemicals, San Fransisco, CA, May 1st, 2017.

**Langholtz, M.**. “Life, Liberty, and the Pursuit of Biomass: The 2016 Billion-Ton Report Release Plenary”. Bioenergy 2016: Mobilizing the bioeconomy through innovation. Washington, D.C., July 12th, 2016.

**Langholtz, M.**, Feedstocks for the Bioeconomy. Advanced Biofuels Leadership Conference. Miami, Florida, June 6th 2016.

**Matthew H. Langholtz**. “The 2016 Billion-Ton Report, Towards a Thriving Bioeconomy”. CRC LCA 2015 Workshop, Argonne, Illinois, USA, October 27th, 2015.

Efroymson, Rebecca Ann, Virginia H. Dale and **Matthew H. Langholtz**. "Environmental and socioeconomic indicators for sustainable production of algal biofuels." Algae Biomass summit, Washington, DC, District of Columbia, USA, September 30 — October 02, 2015.

Kline, Keith L., Virginia H. Dale and **Matthew H. Langholtz**. "Biomass for Bioenergy: an overview of research at ORNL." Biobased economy in northwest Europe, wishful thinking or real opportunities workshop, Utrecht, Netherlands, December 01—02, 2014.

Dale, Virginia H., Laurence M. Eaton and **Matthew H. Langholtz**. "Biomass for bioenergy: resources today and in the future (title stipulated by ESPCA organizer)." FAPESP ESPCA: Advanced School on the Present and Future of Bioenergy 2014, Campinas, Sao Paulo, Brazil, October 10—17, 2014.

Efroymson, Rebecca Ann, Virginia H. Dale and **Matthew H. Langholtz**. "Sustainable Development of Algae for Biofuel: Select Accomplishments and Directions." DOE Algal Biofuels Strategy Workshop, Charleston, South Carolina, USA, March 26—27, 2014.

Kang, Shujiang, et al. "Bioenergy Crop Models [and issues of disturbance]." Global Sustainable Bioenergy (GSB) and LACAf Workshop and Planning Meetings, Atibaia (near Campinas), Sao Paulo State, Brazil, Brazil, November 11—14, 2013.

Griffiths, Natalie A., et al. "Short Rotation Woody Biomass Sustainability." Bioenergy Technologies Office 2013 Peer Review Meeting: Sustainability Platform, Alexandria, Virginia, USA, May 20, 2013.

Stokes, Bryce, **Matthew H. Langholtz** and Laurence M. Eaton. "Billion-Ton Update and Ongoing Resource Assessment ." Bioenergy Technologies Office Peer Review 2013, Alexandria, Virginia, USA, May 20, 2013.

Efroymson, Rebecca Ann, **Matthew H. Langholtz** and Virginia H. Dale. "Sustainable Development of Algae for Biofuel." DOE peer review, Alexandria, Virginia, USA, May 20—23, 2013.

**Langholtz, Matthew H**., Laurence M. Eaton and Anthony F. Turhollow Jr. "2013 BETO Peer Review: Resource Analysis Project WBS 1.6.1.3 ." 2013 BETO Peer Review, Alexandria, Virginia, USA, May 20, 2013.

**Langholtz, Matthew H**. "Billion-ton Update: Opportunities and Challenges in the Utilization of Alternative Fibers." Opportunities and Challenges in the Utilization of Alternative Fibers, Atlanta, Georgia, USA, August 28, 2012.

**Langholtz, Matthew H**. "Billion-ton Update: An Overview, 5th Annual Biomass Supply Chain and Logistics Conference." 5th Annual Biomass Supply Chain and Logistics Conference, Atlanta, Georgia, USA, May 10, 2012.

**Langholtz, Matthew H**., "Harvest Scheduling of Eucalyptus spp. in Florida for Economic and Environmental Optimization." Symposium on the Assessment and Management of Environmental Issues Related to Eucalyptus Culture in the Southern United States, Charleston, South Carolina, USA, February 22—24, 2012.

Dale, Virginia H. and **Matthew H. Langholtz**. "Environmental and Socioeconomic Indicators for Bioenergy Sustainability as Applied to Eucalyptus." Symposium on the Assessment and Management of Environmental Issues Related to Eucalyptus Culture in the Southern United States, Charleston, South Carolina, USA, February 22—24, 2012.

**Langholtz, Matthew**. “Harvest Scheduling of Eucalyptus spp.”. Short Rotation Woody Crops Operations Working Group biannual meeting. Oak Ridge, Tennessee. November 6th, 2012.

**Langholtz, Matthew**. “Overview of the Billion-ton Update”. Florida Energy Summit. Orlando, Florida. August 15th, 2012.

**Langholtz, Matthew**. “Overview of the Billion-ton Update”. Oklahoma EPSCOR Annual State Conference, Stillwater, Oklahoma. October 1st, 2012.

**Professional training:**

Situational Leadership II (SLII), Blanchard Certified, April-October 2014, Oak Ridge National Laboratory, Oak Ridge, TN.

Project Management Foundation Skills, April 27-29, 2011, Management Training & Development Center, Oak Ridge National Laboratory, Oak Ridge, TN.

**Awards:**

Energy Rock Star Award, for leadership in the pioneer summation of the cutting edge research on the potential environmental implications of land-management changes portrayed in Billion-Ton 2016 (BT16). U.S. Department of Energy, Energy Efficiency and Renewable Energy, November 2017.

Science Serving Society Award, Oak Ridge National Laboratory, May 25th, 2017.

Significant Event Award (SEA) for the large team responsible for the exceptionally successful release of the US Billion Ton update report. ORNL Variable Pay Award, 10/01/2011.

Outstanding Teaching Assistant of the Year 2002-2003, Forest Mensuration, School of Forest Resources and Conservation, University of Florida.

University of Florida Alumni Fellowship, 2002.

Co-presenter, Working Forests in the Tropics, Gainesville, FL, February 14th, 2005.

Finalist, World Bank Development Marketplace, Washington D.C., April 2000.

Honorable Discharge, US Army, Infantry, 2000.

Eagle Scout, 1985.