

## DAVID LeBAUER, PhD

University of Illinois  
Carl R Woese Institute for Genomic Biology  
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**Education** 2008. PhD Earth System Science, University of California at Irvine.  
2003. MS Ecology, Agriculture conc., University of California at Davis.  
1998. BS Biology, Duke University.

**Employment** *University of Illinois at Urbana-Champaign*  
2012–present. Research Scientist, Carl R. Woese Institute for Genomic Biology  
Scientific Research Manager, Energy Biosciences Institute Feedstock Productivity and  
Ecosystem Services Modeling Program (2012–2015)  
Fellow, National Center for Supercomputing Applications (2014–present)  
Adjunct, Department of Agriculture and Biological Engineering (2017–present).  
2009–2012. Postdoctoral Researcher, Energy Biosciences Institute.  
  
*North Carolina Agricultural and Technical State University*  
2003–2004. Lab Manager, Mushroom Biology and Fungal Biotechnology Laboratory.  
  
*Duke University*  
1996–2001. Laboratory and Field Technician, Biogeochemistry and Community Ecology Labs.

**Publications** *Monographs*  
**LeBauer, D. S.**, Wang, D., Richter, K. T., Davidson, C. C., Dietze, M. C., (2013). Facilitating  
feedbacks between field measurements and ecosystem models. *Ecological Monographs* **83**(2),  
133–154. doi: 10.1890/12-0137.1.  
  
*Journal articles*  
Black, C. K., Masters, M. D., **LeBauer, D. S.**, Anderson-Teixeira, K. J., DeLucia, E. H., (2017).  
Root volume distribution of maturing perennial grasses revealed by correcting for  
minirhizotron surface effects. *Plant and Soil*. doi: 10.1007/s11104-017-3333-7.  
Jaiswal, D., Larsen, S., De Souza, A., **LeBauer, D. S.**, Miguez, F. E., Sparovek, G., Buckeridge,  
M. S., Bollero, G., Long, S. P., (2017). Brazilian Sugarcane Ethanol As an Expandable Green  
Alternative to Crude Oil Use. *Nature Climate Change*. doi: 10.1038/NCLIMATE3410.  
**LeBauer, D. S.**, Kooper, R., Long, S. P., Mulrooney, P. J., Rohde, S., Wang, D., Dietze, M. C.,  
(2017). BETYdb: A Yield, Trait and Ecosystem Service Database Applied to Second  
Generation Bioenergy Feedstocks. *Global Change Biology Bioenergy*. doi: 10.1111/gcbb.12420.  
Anderson-Teixeira, K. J., Wang, M., McGarvey, J. C., **LeBauer, D. S.**, (2016). Carbon dynamics  
of mature and regrowth tropical forests derived from a pantropical database (TropForC).  
*Global Change Biology*. doi: 10.1111/gcb.13226.  
Hart, E., Barmby, P., **LeBauer, D. S.**, Michonneau, F., Mount, S., Mulrooney, P., Poisot, T., Woo,  
K. H., Zimmerman, N., Hollister, J. W., (2016). Ten simple rules for digital data storage.  
*PLOS Computational Biology*. doi: 10.1371/journal.pcbi.1005097.  
Davis, S., Ming, R., **LeBauer, D. S.**, Long, S., (2015). Toward systems-level analysis of  
agricultural production from Crassulacean Acid Metabolism (CAM): scaling from cell to  
commercial production. *New Phytologist*. doi: 10.1111/nph.13522.  
Wang, D., Jaiswal, D., **LeBauer, D.**, Wertin, T., Bollero, G., Leakey, A., Long, S., (2015). A  
physiological and biophysical model of coppice willow (*Salix* spp.) production for the  
contiguous USA in current and future climate scenarios. *Plant, Cell & Environment*.

- Zhu, X.-G., Lynch, J. P., **LeBauer, D. S.**, Millar, A. J., Stitt, M., Long, S. P., (2015). Plants in silico: Why, Why Now and Framework - An integrative platform for plant systems biology research. *Plant, Cell & Environment*. doi: 10.1111/pce.12673.
- Davis, S. C., **LeBauer, D. S.**, Long, S. P., (2014). Light to liquid fuel: theoretical and realized energy conversion efficiency of plants using Crassulacean Acid Metabolism (CAM) in arid conditions. *Journal of experimental botany* **65**(13), 3471–3478. doi: 10.1093/jxb/eru163.
- Dietze, M. C., Serbin, S. P., Davidson, C., Desai, A. R., Feng, X., Kelly, R., Kooper, R., **LeBauer, D. S.**, Mantooth, J., McHenry, K., Wang, D., (2014). A quantitative assessment of a terrestrial biosphere model's data needs across North American biomes. *Journal of Geophysical Research: Biogeosciences* **119**(3), 286–300. doi: 10.1002/2013JG002392.
- Dietze, M. C., **LeBauer, D. S.**, Kooper, R., (2013). On improving the communication between models and data. *Plant, Cell & Environment* **36**(9), 1575–1585. doi: 10.1111/pce.12043.
- LeBauer, D. S.**, Dietze, M. C., Bolker, B. M., (2013). Translating Probability Density Functions : From R to BUGS and Back Again. *R Journal* **5**(1), 207–209.
- Wang, D., **LeBauer, D. S.**, Dietze, M., (2013). Predicting yields of short-rotation hybrid poplar (*Populus* spp.) for the United States through model–data synthesis. *Ecological Applications* **23**(4), 944–958. doi: 10.1890/12-0854.1.
- Wang, D., **LeBauer, D. S.**, Kling, G., Voigt, T., Dietze, M. C., (2013). Ecophysiological screening of tree species for biomass production: trade-off between production and water use. *Ecosphere* **4**(11), art138. doi: 10.1890/ES13-00156.1.
- LeBauer, D. S.**, (2010). Litter degradation rate and  $\beta$ -glucosidase activity increase with fungal diversity. *Canadian Journal of Forest Research* **40**(6), 1076–1085. doi: 10.1139/X10-054.
- Wang, D., **LeBauer, D. S.**, Dietze, M. C., (2010). A quantitative review comparing the yield of switchgrass in monocultures and mixtures in relation to climate and management factors. *GCB Bioenergy* **2**(1), 16–25. doi: 10.1111/j.1757-1707.2010.01035.x.
- Allison, S. D., **LeBauer, D. S.**, Ofrecio, M. R., Reyes, R., Ta, A. M., Tran, T. M., (2009). Low levels of nitrogen addition stimulate decomposition by boreal forest fungi. *Soil Biology and Biochemistry* **41**(2), 293–302. doi: 10.1016/j.soilbio.2008.10.032.
- LeBauer, D. S.**, Treseder, K. K., (2008). Nitrogen limitation of net primary productivity in terrestrial ecosystems is globally distributed. *Ecology* **89**(2), 371–9. doi: 10.1890/06-2057.1.
- Okano, Y., Hristova, K. R., Christian, M., Jackson, L. E., Denison, R. F., **LeBauer, D. S.**, Scow, K. M., Leutenegger, C. M., Gebreyesus, B., (2004). Application of Real-Time PCR To Study Effects of Ammonium on Population Size of Ammonia-Oxidizing Bacteria in Soil. *Applied and Environmental Microbiology* **70**(2), 1008–1016. doi: 10.1128/AEM.70.2.1008.

#### Conference proceedings

- Lin, T., **LeBauer, D. S.**, Rodriguez, L., Wang, S., (2015). A holistic workflow development for agricultural supply chain analysis: Integration of meteorological forecasting, crop simulation, and supply chain optimization models. In: *1st Climate Change Symposium - Adaptation and Mitigation*. 152143848. ASABE.
- Kooper, R., McHenry, K., Dietze, M. C., **LeBauer, D. S.**, Serbin, S., Desai, A., (2013). Ecological Cyberinfrastructure and HPC Towards More Accurately Predicting Future Levels of Greenhouse Gases. In: *XSEDE13*.

#### Submitted papers

- Anderson-Teixeira, K., Wang, M., McGarvey, J., Herrmann, V., Tepley, A., Bond-Lamberty, B., **LeBauer, D.**, *ForC: A global database of forest carbon stocks and fluxes*.

Dietze, M. C., Fer, I., McCabe, T., Cowdery, E., Desai, A. R., Gardella, A., **LeBauer, D. S.**, Raiho, A., Serbin, S., Shiklomanov, A., New methods for ecological forecasting and model-data integration.

#### Other Software

- LeBauer, D.**, Burnette, M., Willis, C., Li, Z., Pless, R., Hajmohammadi, S., Rohde, S., contributors, T. R., (2017). *TERRA Reference Phenotyping Platform database and computing pipeline* (terraref.org). code: [github.com/terraref](https://github.com/terraref). Version 1.0 beta.
- LeBauer, D.**, Dietze, M., (2017). *Predictive Ecosystem Analyzer (PEcAn)*, [pecanproject.org](https://pecanproject.org). code: [github.com/pecanproject/pecan](https://github.com/pecanproject/pecan). Version 1.5.1. doi: 10.5281/zenodo.1003756.
- Rohde, S., Mulroony, P., Kooper, R., Crott, C., Shirk, A., **LeBauer, D. S.**, (2017). *Biofuel Ecophysiological Traits and Yields database (BETYdb)*, [betydb.org](https://betydb.org). code: [github.com/pecanproject/bety](https://github.com/pecanproject/bety). Version 4.18. doi: 10.5281/zenodo.832983.
- Anderson-Teixeira, K., DeLucia, E., Crott, C., **LeBauer, D. S.**, Rohde, S., Potter, N., Dorsey, J., (2015). *Ecosystem Climate Regulation Services Calculator* ([www.ecosystems-servicescalc.org](http://www.ecosystems-servicescalc.org)). code: [github.com/ebimodeling/ghgvc](https://github.com/ebimodeling/ghgvc). Version 1.0. doi: 10.5281/zenodo.12319.
- Miguez, F. E., Jaiswal, D., **LeBauer, D. S.**, Wang, D., McGrath, J., (2015). *BioCro Crop Productivity and Ecosystem Service Simulation Model*. code: [github.com/ebimodeling/biocro](https://github.com/ebimodeling/biocro). Version 0.93. doi: 10.5281/zenodo.15859.

#### Book chapter

Isikhuemhen, O., **LeBauer, D.**, (2004). "Growing *Pleurotus tuberregium*". In: *Oyster Mushroom Cultivation*. Seoul, Korea: MushWorld, pp. 270–281.

- Grants 2016–2019. Global Sustainable Bioenergy Initiative: Geospatial and environmental analysis of pastureland intensification for bioenergy, FAPESP (Fundacao de Amparo a Pesquisa do Estado de Sao Paulo). Co-PI (\$200k).
- 2016–2019. TERRA REF Computing and Storage Allocation, National Center for Supercomputing Applications: Blue Waters project and CyberGIS Center. PI (\$1m+ in computing resources).
- 2015–2019. A Reference Phenotyping System for Energy Sorghum, U.S. Department of Energy: Advanced Research Projects Agency - Energy (ARPA-E). Co-PI (\$1.7m of \$8.4m).
- 2015–2017. TERRA-MEPP (Mobile Energy-crop Phenotyping Platform), U.S. Department of Energy: Advanced Research Projects Agency - Energy (ARPA-E). Co-PI (\$132k of \$3.4m).
- 2015–2019. The PEcAn Project: A Community Platform for Ecological Forecasting, NSF Division of Biological Infrastructure Award 1458021. Co-I (\$0).
2014. Advancing Software for Ecological Forecasting (Workshop), Microsoft Research Connections, Carl R Woese Institute for Genomic Biology, DOE RCN Forecast. Chair and Co-PI (\$30k).
- 2012–2015. Feedstock and Ecosystem Service Modeling Program, Energy Biosciences Institute. Lead author (\$2.5m).
- 2011–2014. Model-data synthesis and forecasting across the upper Midwest; Partitioning uncertainty and environmental heterogeneity in ecosystem carbon., NSF Advances in Bioinformatics Infrastructure. Co-author (\$770k).

- Awards 2017. Outstanding Students Pushing Innovation (SPIN) Mentor, National Center for Supercomputing Applications.

- 2014–2015. NCSA Fellowship, National Center for Supercomputing Applications (\$25k).
- 2006. Mildred E. Mathias Graduate Research Grant, UC Natural Reserve System, Decomposition responses to nitrogen in a California grassland (\$1k).
- 2005–2007. Graduate Fellowship, Kearney Soil Science Foundation (\$34k).
- 1998. Honors in Ecology and Graduation with Distinction, Duke University Department of Biology.
- 1998. Benenson Award in the Arts, Duke University (\$1.5k).

#### Invited talks

- 2018 *Open Software, Data, and Computing Frameworks to Advance High Throughput Phenomics and Agricultural Forecasting*. Center for Sustainable Resource Science, RIKEN Yokohama Campus, Yokohama, Japan.
- 2018 *Open Software, Data, and Computing Frameworks to Advance High Throughput Phenomics and Agricultural Forecasting*. Data driven crop design technology. Institute of Mathematics for Industry, Kyushu University, Fukuoka, Japan.
- 2018 *Software and Data as Scaffolds for Integrative Science*. Department of Agricultural and Biological Engineering, University of Arizona, Tucson, AZ.
- 2017 *Panelist*. Agricultural Data Integration: From Genomics to Unmanned Systems. Institute of Mathematics and its Applications, University of Minnesota, Minneapolis, MN.
- 2017 *TERRA REF Data and Computing Infrastructure*. DARPA Data Driven Discovery of Models (D3M) Fall Hackathon and Evaluation Dry-Run, Arlington, VA.
- 2017 *TERRA REF Data and Computing Infrastructure..* ARPA-E Joint TERRA and ROOTS Annual Meeting, Saint Louis, MO.
- 2017 *Software and Data as Scaffolds for Integrative Science..* College of Agriculture, Purdue University, West Lafayette, IN.
- 2017 *A Meteorological Data Format That Makes Research Easier and Will Work for Imaging Sensors..* Phenome 2017, Tucson, AZ.
- 2016 *Building Open Access Data, Computing, and Software Infrastructure for High Throughput Phenomics*. Plant Imaging Consortium Annual Meeting, University of Arkansas, Fayetteville, AK.
- 2016 *An open access crop observatory and computing platform for plant breeding*. ROGER Users Meeting, National Center for Supercomputing Applications, Urbana, IL.
- 2016 *Uncertainty Analysis in the Predictive Ecosystem Analyzer (PEcAn)*. PEcAn 2 Terrestrial Model Informatics Workshop, Boston University, Boston, MA.
- 2016 *Opportunities to Improve Cropping Systems with Data*. International Food Security at Illinois Symposium: Using Big Data to Improve International Food Security, University of Illinois, Urbana, IL.
- 2016 *Demonstration of The TERRA Phenotyping Reference Platform*. 5th National Data Service Consortium Workshop, Chapel Hill, NC.
- 2015 *An open-access platform for quantification of plant traits from big sensor data*. Informatics for Reproducibility in Earth and Environmental Science Research, American Geophysical Union, San Francisco, CA.
- 2015 *Software for Ecological Inference and Prediction: What We Have and What We Need*. Developing, Maintaining, and Employing Large Computational Frameworks in the Ecological Sciences. Statistical and Applied Mathematical Sciences Institute, Durham, NC.
- 2014 *Modeling the Productivity and Ecosystem Services of Sugarcane*. Global Sustainable Bioenergy / FAPESP annual meeting, Piracicaba, Brazil.
- 2014 *PEcAn: A probabilistic modeling workflow for deterministic models*. FACE-IT Workshop, Computation Institute, University of Chicago, Chicago, IL.

- 2013 *Modeling Bioenergy Feedstock Productivity and Ecosystem Services*. Global Bioenergy Crop Modeling Workshop, Oak Ridge National Laboratory, Oak Ridge, TN.
- 2013 *Reducing uncertainty through data-driven model development*. Uncertainty Analysis: A Critical Step in Ecological Synthesis, Organized Oral Session, Ecological Society of America Meetings, Minneapolis, MN.
- 2010 *PEcAn, a workflow management tool for real-time data assimilation and forecasting*. Combining Experiments, Process Studies, and Models to Forecast the Future of Ecosystems, Communities, and Populations. Organized Oral Session, Ecological Society of America Meetings, Pittsburgh, PA.

- Teaching
2017. Data Science in Modern Agriculture (Seminar), University of Illinois Department of Agricultural and Biological Engineering, Urbana, IL.
2017. Instructor, Computational Mathematics Bootcamp, Program for Interdisciplinary and Industrial Internships at Illinois, Urbana, IL. [pi4-uiuc.github.io/2017-bootcamp](https://github.com/pi4-uiuc/2017-bootcamp).
2017. Instructor, Advanced Phenomics Workshop, Purdue University Departments of Agronomy and Agricultural and Biological Engineering, West Lafayette, IN..
- 2017–present. Instructor, Urbana Math Circle, Urbana, IL. [urbanamathcircle.blogspot.com](http://urbanamathcircle.blogspot.com).
- 2015–present. Software Carpentry Instructor.
2015. Instructor, Cultivating Shiitake on Logs, Land Connection Workshop, Urbana, IL.
- 2013–2014. Instructor, PEcAn Software Training, Ecological Society of America Meetings.
2009. Instructor, Global Change Biology, California Summer School for Science and Math.
2008. TA, Experimental Biology Lab, UC at Irvine. [sites.google.com/site/bio100l/lab14](https://sites.google.com/site/bio100l/lab14).
2008. TA, Atmospheric and Environmental Sciences, California Summer School for Science and Math.
2008. TA, GIS for Environmental Science, UC Irvine.
2007. TA, Global Change Biology, UC Irvine.
2006. TA, GIS for Environmental Science, UC Irvine.
2003. Instructor, Shiitake Cultivation Workshops, Hosted by NC Extension at multiple locations.
2003. TA, Mushroom Cultivation, UC Davis.
1997. TA, Archaeology and Geology Southwest field trip, Duke Talent Identification Program.

#### Service *Academic*

- 2015–present. Undergraduate Student Mentor. Students Pushing Innovation Program, National Center For Supercomputing Applications.
- 2015–2016. Reviewer. EarthCube Architecture Conceptual Design.
- 2014–2016. Graduate Student Summer Intern Mentor. Program for Interdisciplinary and Industrial Internships at Illinois.
- 2012–2016. Campus Representative. National Ecological Observatory Network (NEON).
- 2009–2011. Expert for Climate Science Experts Referral Service. American Geophysical Union.
- 2006–2008. Judge. California State Science Fair.
- 2006–2007. Graduate Student Representative. UCI Department of Earth System Science.
- 2005–2006. Graduate Student Seminar Organizer. UCI Department of Earth System Science.
2003. Project Mentor. FARMS Leadership, Inc. and Sacramento Public Schools.
- 1998–1999. Guest Teacher, K-12. Sigma Xi, Scientists in the Classroom.

#### *Workshops*

- February 2018. Co-organizer. Big Data Driven Agriculture: Advances, Challenges, and Opportunities. USDA NIFA-FACT, Alexandria, VA.

November 2017. Invited participant. The Subterranean Macroscopic: Sensor Networks for Understanding, Modeling, and Managing Soil Processes. NSF, Chicago, IL.

February 2017. Co-organizer, lead instructor. Using TERRA REF phenotyping data. Phenome 2017, Tucson, AZ.

January 2017. Invited Participant. Moving Field Phenomics From Theory to Practice. US-UK Phenomics Workshop, Maricopa, AZ.

October 2016. Invited Participant. Plant Science Cyberinfrastructure Initiative. Plant Science Research Network, Washington, DC.

August 2016. Session Co-Organizer. Hacking Ecology 2.0, a showcase of open tools for data-driven ecology. Ecological Society of America Annual Meetings, Fort Lauderdale, FL.

November 2014. Workshop Co-Organizer. Soil Carbon Cycle Super-Modeling. Biosphere 2, Oracle, AZ.

August 2014. Symposium Co-Organizer. Challenges and Advances in Statistical Software For Ecology. Ecological Society of America Annual Meetings, Sacramento, CA.

March 2014. Workshop Chair and Co-Organizer. Advancing Software for Ecological Forecasting. Urbana, IL.

#### *Grant Reviews*

US National Science Foundation

#### *Journal Reviewer*

Applied Soil Ecology, Ecology, Ecology Letters, Ecological Applications, Frontiers in Plant Science (Review Editor), Global Change Biology, Global Change Biology - Bioenergy, Geophysical Research Letters, Journal of Geophysical Research, Journal of Geophysical Research - Biogeosciences, Nature Climate Change, Nature Scientific Reports, New Phytologist, Plant Soil

#### *Consultancy*

2015–present. Senior Scientific Advisor, Agribile, Inc., Champaign, IL

2015–2016. Smithsonian Institution, CTFS – ForestGEO Ecosystems and Climate Initiative, Falls Church, Va

2011–2014. Global Change Solutions, LLC, Urbana, IL

1999–2000. Wildflower Organics, Dawsonville, GA

2000. Crabtree Valley Farms, Chatanooga, TN

1999. Sustenance Farm, Bear Creek, NC