

Biomass to Biochar Workshop Authors

Jim Amonette holds a joint appointment with the US Department of Energy's Pacific Northwest National Laboratory and Washington State University's Center for Sustaining Agriculture and Natural Resources. He has more than forty years' experience in research related to soil chemistry, and more than twenty years' experience focusing on carbon sequestration by soil systems. The last 15 years he has devoted a major part of his work to biochar with a focus on assessing the potential impact that biochar can have in drawing down carbon from the atmosphere. He led the team that developed and published a highly cited global-scale study on the topic in *Nature Communications* (Woolf et al., 2010) and more recently has modified that algorithm to make similar calculations at smaller scales, down to the county level. He currently is working on life-cycle analyses of biochar production technologies and finishing up a three-year project estimating the impact that adoption of biochar and bioenergy over the course of a century can have on carbon drawdown by each county in the state of Washington.

Jim Archuleta started as a Soil Scientist within the Forest Service (FS) in 1995 for the Umpqua NF (Diamond Lake Ranger District). Working with the area's nutrient poor soils, he promoted forest soil health in a variety of ways. Providing analysis in support of the National Environmental Policy Act (NEPA), helping to limit detrimental impacts from proposed future projects. Finding various organic amendment applications for pumice soils to improve vegetation production. Completing two equipment patents; for equipment to eliminate detrimental soil impacts from past forest management. Moving from the west to east, he began to work on the dry eastern Oregon forests. As the Umatilla NF Forest Soil Scientist; he managed the Blue Mountain Terrestrial Ecosystem Unit Inventory (TEUI) contract, mapping the soils across the three national forests of the Blue Mountains. Currently he is working as the Regional Biomass and Wood Innovation Coordinator (OR & WA). This work is to manage on average of 10 million dollars of federal reimbursable grants in any given year. Over his career he has also been honored with recognition for soils work with the 2009 Region 6 Rise to the Future Award (FS), the 2011 National Field Soil Scientist (FS). Then recently receiving the Chief's Awards (FS), Under Secretary's Award (USDA) and the 70th Secretary's Honor (USDA) for work in Wood Innovations.

Raymond Baltar became interested in biochar as a Green MBA student in 2009 working towards an MBA in Sustainable Enterprise from Dominican University of California. Raymond serves as Director of the Sonoma Biochar Initiative, established in 2009 and one of the earliest regional biochar groups, as well as Biochar Projects Manager at the Sonoma Ecology Center and Interim Director of the California Biochar Association. Raymond served as Chair of the 2012 USBI national conference in Sonoma County, and since then has focused on biochar education and training, research, policy development, and management of a number of biochar-related projects. These include a Department of Water Resources field trial, a biochar production facility and several research reports for the Redwood Forest Foundation, Inc., a Biochar School event, a Conservation Burn Workshop and Training series, and a Citizen's Science Project. He is currently consulting for the Mendocino RCD and All Power Labs on a CalFire grant turning fire damaged biomass into energy and biochar, working with the California Air Pollution Control Officers Association on a conservation burn/flame-cap kiln emissions testing protocol, and led a *Scaling Biochar Forum* in Fall 2020.

Ken Carloni earned a B.S. in Botany/Entomology and a M.S. in Evolutionary Ecology from the University of Connecticut, and a Ph.D. in Forest Ecology from Oregon State University. He taught a range of Biology and Natural Resources classes at Umpqua Community College from 1987 to 2018. Since retirement, he has focused on ecological restoration and biochar kiln design and testing as the Education Program Chair of the Yew Creek Land Alliance, Inc., and just completed a 12 acre NRCS-funded habitat restoration/biochar project on the Yew Creek Land Alliance's 380 acre property in southwest Oregon.

Christos Christoforou is a permit engineer, working with the Northwest Clean Air Agency. He has been with the agency for more than 14 years. He writes both minor NSR and Title V permits, and also inspects Title V sources. He is the NWCAA emissions inventory lead for major sources.

Doug Collins is an Extension Faculty with the Washington State University (WSU) Center for Sustaining Agriculture and Natural Resources and an affiliate faculty with the WSU Department of Crop and Soil Sciences. Doug's research program is focused on organic vegetable cropping systems and managing and monitoring soil fertility. His current research includes work to examine the impact of biochar and co-composted biochar on strawberry and potato production in Western Washington. Doug has a Ph.D. in soil science from Washington State University, an M.S. in Plant Pathology from Montana State University, and a B.A. in biology from Colorado College. He previously worked for Ribeiro Plant Lab, Inc., Seattle Tilth Association and the Washington Toxics Coalition and served on the board of directors of Tilth Producers of Washington. He currently serves on the Washington State Department of Agriculture Organic Advisory Board.

Jim Dooley is co-founder and Chief Technology Officer of Forest Concepts, LLC in Auburn, Washington. He built his 45-year career in industry by combining a deep understanding of plant biology with disciplined engineering design and social sciences to create innovative products, processes and equipment. Jim holds agricultural engineering degrees from Cal Poly, San Luis Obispo and the University of California at Davis. His PhD is in forest resources and forest engineering from the University of Washington. He is a Fellow of three scientific and technical societies – American Society of Agricultural Engineers (ASABE), the Institute of Biological Engineering (IBE), and the American Institute for Medical and Biological Engineering (AIMBE). He was President of IBE in 2000 and ASABE in 2008. Commercial products resulting from his development programs have won recognition from ASABE, the International Erosion Control Association, USDA-NIFA, the U.S. Forest Service, and the Renewing the Countryside Foundation.

David Drinkard is the Chief Executive Officer of Ag Energy Solutions, Inc., which converts various agricultural waste into synthetic gas and high value natural carbon material.

Gloria Flora directs Sustainable Obtainable Solutions (SOS), a non-profit ensuring the sustainability of public lands which she founded after 23 years in US Forest Service leadership. She's an expert consultant and speaker on large landscape conservation strategies, climate change action, collaboration, biochar, environment/natural resource issues and permaculture. Gloria founded and directed the U.S. Biochar Initiative (USBI 2009-2016), as a project of her non-profit, SOS. Gloria continues to promote the sustainable production and use of biochar through articles, presentations and demonstration. Biochar fits in the nexus of SOS's work in forest restoration, climate change, and community and environmental prosperity. Gloria and her

husband are growing TerraFlora Permaculture Learning Center focused on agroforestry-based permaculture in forested environments. Flora's won many national awards for environmental leadership and action, including having a new species of a Tanzanian toad named after her.

Mark Fuchs is a Hydrogeologist in the Washington Department of Ecology's Solid Waste Management Program in the Eastern Region Office in Spokane. He is the project manager for the waste to Fuels Technology partnership with Washington State University, Center for Sustaining Agriculture and Natural Resources. This partnership works to recover municipal organics for energy and fuels, fertilizers, compost and biochar, and, other valuable co-products. Note: Since this project began, Mark has retired from his position with Washington Department of Ecology.

Manuel Garcia-Perez is an Associate Professor of Biological Systems Engineering at Washington State University. His work is in the Bioenergy and Bioproducts Engineering research emphasis area and addresses the environmental burden associated with the world's petroleum resources. His group seeks to understand the relationship between some biomass compositional parameters such as: cellulose crystallinity and degree of polymerization, content of hemicelluloses and molecular weight and structure of lignin, the pyrolysis conditions and the distribution of products resulting from their thermochemical reactions.

Geoffrey Glass is an environmental engineer at the U.S. EPA's Region 10 office in Seattle. His primary duties relate to how federal standards apply to stationary sources in Alaska, Idaho, Oregon, and Washington. Previously, Mr. Glass worked as an air permitting engineer at EPA Region 9 in San Francisco and the Olympic Region Clean Air Agency in Olympia. As a graduate of Oakes College of the University of California at Santa Cruz (BA, Economics) and the University of Washington (MS, Chemical Engineering) he is entitled to wear a purple cap and gown.

Han-Sup Han is currently a Professor/Director of Forest Operations and Biomass Utilization at Ecological Restoration Institute, Northern Arizona University (NAU), Flagstaff, Arizona. His current research efforts focus on the production of quality feedstocks from forest residues and development of innovative biomass supply chain logistics. Along with this effort, he is looking at the maximum utilization and value recovery from small-diameter trees and forest residues resulting from thinning treatments and timber operations. Han, along with 13 Co-PIs (Principal Investigators) and research partners, recently completed an innovative biomass research project, Waste to Wisdom (<http://wastetowisdom.com/>) funded by the U.S. Department of Energy.

Karen Hills, Research Associate with Washington State University's Center for Sustaining Agriculture and Natural Resources, contributes to numerous projects relating to re-use of organic materials in agricultural systems. Karen earned a B.S. in Rural Sociology from Cornell University, an M.S. in Soil Science from University of Vermont, and a Ph.D. in Crop Science from Washington State University. Her specific area of interest is sustainable management of soil and nutrients. Karen currently lives in Anacortes, WA.

Kai Hoffman-Krull is the Forestry Program Director for the San Juan Islands Conservation District, and has been a part of biochar research with Dr. Tom DeLuca and Dr. Si Gao since 2015. Their research has been published in *Biogeochemistry* and *Agriculture, Ecosystems, and Environment*. Kai is currently working with Dr. DeLuca and Dr. Gao on a research project on

in- forest produced biochar and the subsequent soil and plant response in woodland conditions. Kai has written journalism articles on biochar for Growing for Market, The Sound Consumer, Rodale Institute, and Stone Pier Press. Kai has provided biochar education throughout the San Juans and Western Washington since 2016 in collaboration with the Northwest Natural Resource Group.

Josiah Hunt is the Chief Executive Officer of Pacific Biochar. He graduated from UH Hilo in 2004 with a BS in Agroecology and Environmental Quality. From his rural home farm on the Big Island of Hawaii he has helped to pioneer methods for biochar production, processing, and application in farming systems using organic and biological approaches since 2008.

Tom Jobson is a Professor in the Department of Civil & Environmental Engineering and the Laboratory for Atmospheric Research at Washington State University. His research interests include measurement of trace organic gases in the atmosphere, trace gas instrumentation, and global climate change. Over the last several years, his projects have included work investigating air emissions from commercial composting facilities, and the impacts of biochar co-composting on air emissions.

Marcus Kauffman serves as the Biomass Resource Specialist for the Oregon Department of Forestry. In this positions he aims to create, enhance, and sustain viable markets for the by-products of forest management and forest products manufacturing. Marcus provides multi-media content, technical assistance, project development resources, and biomass supply information to public and private interests across the state. A firm believer in coordinated collective action, he led the Oregon Statewide Wood Energy Team and is the former Chair of the Council of Western State Foresters—Forest Utilization Network. He has a keen interest in advancing forest utilization opportunities and deepening its impact on working forests, rural communities, and the forest products industry.

Adrian Kiser is an intern with the State and Private organization of the US Forest Service. He assists Jim Archuleta with the Pacific Northwest Region's Wood Innovations Program. Adrian studied forest health and ecological restoration at Northern Arizona University's School of Forestry. He completed his Master of Forestry there in the Spring of 2019.

David A. Laird received a PhD in Soil Science from Iowa State University in 1987. From 1988- 2010 he was a research soil scientist with USDA-ARS , while from 2010-2018 he was a professor of soil science in the Department of Agronomy at Iowa State University. In 2016, he founded (and remains president of) N-Sense, LLC. From 2018 through the present, he has been an editor for Geoderma handling the biochar and mineralogy portfolios. Over the course of his career, he has been the major professor for 20 M.S. and Ph.D. students and served on 34 other M.S. and Ph.D. committees. He has been the author or co-author of over 140 refereed journal articles and book chapters, including over 50 articles on biochar. Google Scholar lists over 15,000 citations and an h-index of 53.

Wayne Lei retired recently as Director of Research and Development at Portland General Electric - a function he led for over 10 years. Notable projects included installation of a grid-scale, 5 MW, 1.25 MW-hr lithium ion battery in Salem and obtaining 5,000 tons of torrefied, renewable biomass for a successful test burn to replace the coal used at PGE's Boardman Power Plant. Prior to this, Lei was Director of Environmental Policy at PGE and also served in the nuclear power industry for ten years. Currently, he serves as the Chief Technical Officer for Oregon Torrefaction, LLC. He holds a doctorate in Environmental Health Sciences as well as degrees from Oregon State University and Oberlin College.

John Miedema is founder and CEO at BioLogical Carbon LLC. (BLC) in Philomath, Oregon. BLC's primary mission is applied research and production of high-quality biochar medias for remediation of environmental toxins and building soil fertility. In 2007, as Director of Biomass Energy for Thompson Timber and Starker Forests, John built an integrated pyrolysis and gasification facility for biochar research and product development. John now continues his work today at the same location. In addition to long stints as an Alaskan fisherman and an electrical contractor, John has spent the past 2 decades studying and designing sustainable energy systems integrated with resource management and food production.

Tom Miles is the president of T.R. Miles, Technical Consultants, Portland, Oregon, a biomass energy consulting firm, which designs, develops, installs, and commissions systems for processing wood, agricultural, and urban residues. His knowledge of ash transformations led to recycling nutrients using pyrolysis of residues to biochar. He has sponsored and hosted online discussions of biomass energy since 1994 and biochar since 2006. He is past chairman of the International Biochar Initiative and Executive Director of the US Biochar Initiative.

Debbie Page-Dumroese is a Research Soil Scientist with the USDA Forest Service, Rocky Mountain Research Station located in Moscow, ID. She has worked on harvest impacts on soil properties and processes, developed a soil disturbance monitoring protocol for the Forest Service, and leads the North American Long-Term Soil Productivity study. For the last decade she has also worked on minimizing slash pile burning and creating biochar from low- and no- value woody residues. She has numerous field sites evaluating biochar application on forest, range, and abandoned mine sites to restore soil health.

Brennan Pecha received a BS in Chemistry in 2011 from the University of Dallas but his interest in renewable energy and materials led him to pursue graduate school in the field of chemical engineering, where he received a PhD in 2017 at Washington State University. His thesis research under the mentorship of Dr. Manuel Garcia-Perez focused on the fundamental chemistry and physical phenomena of biomass pyrolysis, resulting in a number of publications with his collaborators. After WSU he took up a position at the National Renewable Energy in Golden, CO where he shifted his attention to simulating biomass pyrolysis and catalytic vapor phase upgrading as well as circular-economy concepts for building a more sustainable and secure future.

Carlos Rodríguez- Franco has a doctorate in Forest Sciences from Yale University. In Mexico he worked for the National Institute of Forestry, Agriculture and Animal Husbandry Research (INIFAP) for 25 years. He was the former Forestry Research General Director at INIFAP from 1996 to 2000. Currently, he works with the US Forest Service, where he is a Senior Forester. He is the former Deputy Chief for Research and Development (2016 – 2018). He has covered several positions as the Associate Deputy Chief for Forest Service Research & Development. Previously he was the Director for Forest Management Sciences staff from 2007 to 2013. He has written more than 90 scientific articles on forestry subjects published in Mexico and the USA. Some of his contributions were his participation in the “Forestry Compendium” published by Centre for Agriculture and Bioscience International in the United Kingdom, and the book “Pines of silvicultural importance” that was published by CAB International.

Grant Scheve is a Sales and Marketing Manager for Agra Marketing Group, in Ashland, OR.

Carson Sprenger is the principal at Rain Shadow Consulting, a forestry consulting and contracting company based in the San Juan Islands since 2005. Carson’s M.S. work from UW included a tree-ring reconstruction of fire history and stand dynamics of mixed oak Douglas-fir forests. Carson has been working with low-tech flame-cap biochar kilns for about 6 years, finding ways to incorporate in-stand char production on forest restoration projects. He works with logging contractors and Rain Shadow’s own crew to implement biochar production as much as possible. Carson started Orcas Biomass in July 2019 in order to better process and supply the county with biomass products including biochar.

Bruce Springsteen has been with the Placer County Air Pollution Control District for 15 years, currently as Permitting and Compliance Manager. He continues to look at the air pollution impacts of forest management and biomass utilization. Previously he was with an energy and environmental service consulting firm for 15 years, focusing on air pollution control solutions for fuel and waste combustion systems. He has a Masters of Science Degree in Mechanical Engineering from the University of California, Davis.

Sean Thompson received his PhD from the Department of Soil & Crop Science at Texas A&M University working on high-throughput phenotyping of above and below ground crop physiology using remote sensing technologies. Additionally, he completed his MS in Molecular & Environmental Plant Science from Texas A&M studying plant nutrient uptake and management at the cellular level. His current appointment is with the Washington State Department of Ecology, Water Quality Program, in Spokane.

Kristin Trippe is a Research Soil Microbiologist with the USDA Agricultural Research Service based in Corvallis, Oregon. Her laboratory studies the ability of biochar-based amendments to improve the health of marginal and degraded agricultural soils. She has developed tools to help farmers identify soil deficiencies and then pair those deficiencies with specific biochars to improve soil health outcomes. Kristin serves as a Board Member of the US Biochar Initiative and is the Chair of the Soil Biology and Biochemistry Division of the Soil Science Society of America.

Edward Wheeler is the Program Director for Lenz Enterprises, where he directs the planning, development and implementation of professional services with responsibility for business development, financial resource planning, environmental engineering, permitting, sustainability, facility operation, safety and compliance. Edward's career has spanned over 30 years and includes a wide-array of US and international environmental projects in the fields of recycling, solid waste, hazardous waste, remediation, fluvial geomorphology, water quality, human health and the bio-economy. Edward is also Vice President for WCG, an environmental consulting company managing environmental projects and evaluating design and operation of environmental systems.

Kelpie Wilson is a writer and a mechanical engineer, working as an independent biochar consultant since 2012. Throughout the 1990s, Kelpie was a forest protection advocate with the Siskiyou Regional Education Project, located in rural Oregon. From 2008 to 2012 she worked for the International Biochar Initiative as a project developer and managed the multi-stakeholder process to create the first set of standards and testing guidelines for biochar. She pioneered development of the Flame Cap Kiln biochar production technology for use by forestry contractors and small farms, and presents many workshops each year bringing this technology to end users.

Georgine Yorgey is the Associate Director of WSU's Center for Sustaining Agriculture and Natural Resources, where she has worked since 2009. She leads the Center's efforts around recovery of organic wastes, including work on utilization of dairy-derived nutrients, biochar, and compost in agricultural systems. She also co-leads the Center's efforts relating to climate change and agriculture. She has a Master of Public Administration from University of Washington, and a Bachelor of Arts in Biology from Swarthmore College.