Morgan M. Williams

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PERSONAL STATEMENT

My work operates at the intersection of soils and society. I'm focused on determining how to design soil systems for the long term performance of engineering tasks in urban and industrial areas given the inevitability of dynamic change over time. I have a mix of academic, non-profit, government, and industry experience in conventional field pedology, soils engineering, land reclamation, environmental sensor design, industrial equipment fabrication and multi-stakeholder engagement which aid in my ability to contribute fundamental and applied knowledge at this intersection. I'm responsible as PI or CO-PI for securing over $1.35m in research funding, and as a collaborator for an additional $6.28m in funding.

ACADEMICS

PhD Soil Science, Department of Geography, University of California, Berkeley. (*in progress)* *2013 - Present*
-Member of The Environmental Systems Dynamics Laboratory (ESDL). Advisor: Dr. Laurel Larsen
-Thesis: "Rates and Qualities of Soil Change In Technosols Employed for Uranium Waste Containment"

B.S. Biology/Chemistry (high honors), Warren Wilson College, Asheville, NC. *2004 - 2008*
- Thesis: "The Effect of Structured and Random Noise Vibrations on The Cellular Development of The African Violet (*Saintpaulia ionantha*)"

Wildlife Ecology and Conservation, The School for International Training, Northern Tanzania. *2007*
- Thesis: "The Ceremonial Plant and Animal Use of The Elang'ata-Dapash Maasai"

APPLIED RESEARCH AND INDUSTRY EXPERIENCE

V.P. of Research and Development, EDYN, INC, Oakland, CA *2014 – Present*
We design and manufacture wireless soil sensors and actuators for precision management of water and nutrients.
»I develop R&D protocol for sensor and signal processing, hardware performance testing, and assembly line QA.
»I work with the data science team to develop and deploy algorithms for user specific automated management.
»12,000 active users, and counting.

Founder/Pedologist, Applied Soils, LLC Oakland, CA *2013 – Present*
Focused on the research, development, and manufacture of engineered soil systems
» U.S. Department of Energy-LM Contractor. Soil change on engineered cover systems. $262,000 (2015-2018)
» Private Company Contractor. Development of precision soil systems for containerized gardens. $72,500 (2015)
» Private Company Contractor. Development of organic products for soil moisture control. $68,000 (2014-2015)
» Private Company Contractor. Development of biologically activated nutrient delivery pellets. $141,500 (2013)

Co-Founder/President, Biochar Solutions, LLC Carbondale, CO *2011 – Present*
» Designer and manufacturer of bioenergy and carbon sequestration equipment. 19 clients in 3 countries.
» Manufacturer of carbon negative soil amendments for remediation. Clients in 50 states & 6 Canadian Provinces.
» Department of Energy BRDI project partner for equipment optimization and life cycle assessment ($5.88m).

» 1 of 11 finalists (out of 10,000 surveyed) in The Virgin Earth Challenge, a $25M science prize to remove carbon from the atmosphere.

Co-Founder/Manager, Biochar Reclamation Labs Carbondale, CO *2010 – 2014*

» Conducted the world's' first carbon negative biochar mine reclamation project. *"A scaled approach to the reclamation of an abandoned mine with biochar."* Supported by For The Forest/USFS - $100,000 *2010-2012*

» Conducted soil reclamation work on silver, uranium and coal mines in addition to oil and gas drilling pads.

» Sold company in 2014.

Co-Founder/Executive Director, Flux Farm Foundation Carbondale, CO *2007 – 2011*

» Raised $280,000 in private donations and $433,000 in public funding to conduct fundamental and applied research in the areas of semi-arid bioenergy production, distributed butanol processing, dry-land carbon sequestration, and agricultural micro-hydro development.

» Directly helped ranching families secure over $1M in federal grants and low-interest loans to construct renewable energy projects on their properties.

Select Projects

1) "*Developing low-input, high-biomass, perennial cropping systems to support a bioenergy economy on marginal land at higher elevations."* Supported by The South Central Sun Grant Initiative - $75,000. *2011-2013.* CO-PI with Dr. Calvin Pearson, Colorado State University (CSU).

2) *"Testing cool-season perennial grasses for low-input biomass production and persistence in cold high-elevation growing environments of the semiarid western United States."* Cooperative Agreement with The USDA-ARS # 420802. *2010-2013*. CO-PI with Dr. Steve Larson, USDA-ARS.

3) *"An analysis of supplemental biomass production through the establishment of short rotation woody crops (SRWC) in the Roaring Fork Valley."* Supported by The Colorado Governor's Energy Office and For The Forest - $98,000. *2010-2011.* CO-PI with Dr. Calvin Pearson, CSU.

4) *"The western Colorado agricultural micro-hydroelectric development project."* Supported by the USDA Natural Resources Conservation Service - $187,500. 2009-2012. PI.

5) *"Evaluation of perennial plant species and production inputs for sustainable biomass and bioenergy production in western Colorado."* Supported by The Colorado Department of Agriculture ACRE Grant - $76,000. *2009-2011*. CO-PI with Dr. Calvin Pearson, CSU.

6) ***"****Carbon negative bioenergy through the soil sequestration of pyrolysis biochar on Colorado pastureland: measuring the effects on forage yield, soil chemical properties, and microbial activity."* Supported by The Colorado Department of Agriculture ACRE Grant - $96,000. *2008-2010***.** CO-PI with Dr. Mary Stromberger, CSU and Dr. Jim Ippolito, USDA-ARS.

PUBLICATIONS

Williams MM. Horizontal impact gradients of emergent vegetation on near surface hydrological properties of an engineered soil system for uranium waste containment in northern New Mexico. *In Preparation.*

Williams MM. Qualities of soil change in technosols engineered for waste containment: processes, rates, and implications to intended performance. *In Preparation.*

Williams MM., Likos W., Wang X., Tian K., Waugh J., Albright W., Stefani N, Benson C. The performance of compressed clay barriers after 20 years of soil change: variations in radon flux as a function of soil morphological development pathways across uranium disposal cells of different design specification and climate. *In Preparation.*

Pearson C., **Williams MM**., Rock CD. Agricultural production of Prickly Pear Cactus for biomass production in the intermountain West. *Technical Report*, Colorado State University, Agricultural Experiment Station. 2015.

Harley A., **Williams MM**., and McMullen B. Biochar for reclamation in the Rocky Mountains: context, science and policy – can we find a nexus that works. Proceedings from the 30th Annual Meeting of The American Society of Mine Reclamation, 2013.

Harley A., **Williams MM.** A technical review of biochar to evaluate its potential risks and constraints for reclamation of abandoned mine lands on U.S. National Forest lands. *White Paper* prepared for the U.S. Forest Service. 2011.

Williams MM., Pearson, C. Evaluation of perennial plant species for sustainable biomass and bioenergy production in western Colorado. *White Paper* prepared for The Colorado Department of Agriculture. 2011.

Williams MM. An analysis of supplemental biomass production through the establishment of short rotation woody crops (SRWC) in the Roaring Fork Valley. *White Paper* prepared for The Colorado Governor's Energy Office, 2011.

Williams MM., Stromberger M, Ippolito J. The soil sequestration of pyrolysis biochar on Colorado pastureland: measuring the effects on forage yield, soil chemical properties, and microbial activity after 2-years. *White Paper* prepared for The Colorado Department of Agriculture. 2010

Williams MM., and Arnott J. A comparison of variable economic costs associated with two proposed biochar application methods. Annals of Environmental Science, Volume 4, August 2010, Pages 23-30.

PRESENTATIONS

21) The 3rd International Conference on Hydropedology. Beijing, China. 2016. *Patterns of Decadal Soil Change on Technogenic Soil Systems Employed for Radioactive Waste Containment.*
20) Invited Lecture – Department of Geography - UC Berkeley, CA. 2014. *Soil change in the anthropocene: an introduction to the anthrosols and technosols.*
19) SSSA/Berkeley Lab – Complex Soil Systems. Berkeley, CA. 2014. *Panarchy in soil systems: towards evaluating resilience across multiple spatial scales.*
18) The 10th American Renewable Energy Day, Aspen, CO. 2014. *The next generation and the great transition*
17) SSSA – Soils Role in Restoring Ecosystem Services, Sacramento, CA 2014. *Biochar as a nexus for soil, climate, water and forest management in the Rocky Mountains: three case studies in mine reclamation*
16) East-West The Art of Dialogue, Washington D.C., 2013. *Building green bridges: renewable energy diplomacy for the US and Egypt*
15) American University, Cairo, Egypt. 2013. *Renewable Energy Diplomacy for the US and Egypt*
14) The Weather Channel Climate Conversation, New York, NY. 2013. *New frontiers for climate solutions*
13) The 3rd US Biochar Conference, Sonoma, CA. 2012. *Biochar pathways to sequester a gigaton*
12) Forest's At Risk Symposium, Aspen, CO. 2012. *Collaborative restoration for carbon draw-down*

11) Creating Climate Wealth, Washington D.C. 2012. *Biochar for ecosystem restoration*
10) The Global Clean Energy Congress, Calgary, Canada. 2011. *From carbon liabilities to carbon solutions*
9) PriceWaterhouseCoopers Carbon Summit, London, England. 2011 – *An introduction to Biochar Solutions*
8) The 7th American Renewable Energy Day, Aspen, CO.2011. *Biochar: turning carbon problems into solutions*
7) The 4th World Conference on Ecological Restoration, Merida, Mexico. 2011. *The carbon neutral reclamation of an abandoned silver mine with biochar - preliminary results from The Hope Mine*
6) Biomass For Biofuels in Western Colorado, Rifle, CO. 2011. *A new type of agriculture for the west*
5) The 3rd World Conference of The International Biochar Initiative, Rio De Janeiro/Manaus, Brazil. 2010. *An assessment of biochar application methods*
4) Colorado Renewable Energy Conference, Alamosa, CO. 2010. *Low-input bioenergy production in Colorado*
3) The 63rd Annual Meeting of The Society for Range Management - Rangeland Technology and Equipment Council, Denver, CO. 2010. *Biochar and biofuels: opportunities and challenges for rangeland*
2) The Colorado State University Clean Energy Supercluster Conference, Montrose, CO. 2010. *Opportunities and challenges for cellulosic bioenergy production and carbon sequestration in western Colorado*
1) Clean Energy Economy for the Region, Aspen, CO. 2009. *Bioenergy in the Roaring Fork Valley*

INTERDISCIPLINARY WORKING GROUP PARTICIPATION

1) International Biochar Initiative - Expert Panel on Stable Biochar Test Methodologies
2) Colorado State University's Clean Energy Strategic Initiative Team (CESIT)
3) USDA-ARS Dryland Forage and Biomass Research Group
4) Western Colorado Carbon Neutral Bioenergy Consortium (WCCNBC)
5) Roaring Fork Valley Biomass Consortium
6) Western Governor's Association Bioenergy Policy Recommendation Committee

AWARDS/HONORS

1) Young Alumni Award (inaugural recipient) – Warren Wilson College - 2014
2) Student Fellow Award – Complex Soil Systems Conference - 2014
3) Chancellor's Fellowship – University of California, Berkeley – 2013
4) Gabr Fellow – East West Diplomacy - 2013
5) Global Pioneer – Virgin Earth Challenge – 2011
6) Aspen Institute Environmental Scholar – 2011
7) Colorado State University Extension Award – 2010