

DEIRDRE E. GRIFFIN, M.S.

Department of Land, Air and Water Resources
University of California, Davis
(202) 415-3614 • degriffin@ucdavis.edu

EDUCATION

Ph.D. Candidate, Soils and Biogeochemistry, University of California, Davis

Major professors: Dr. Kate M. Scow, Soil Microbial Ecology; Dr. Sanjai J. Parikh, Soil Chemistry

Degree anticipated: June 2018

NSF Graduate Research Fellow

M.S., Soils and Biogeochemistry, University of California, Davis

Major professors: Dr. Kate M. Scow, Soil Microbial Ecology; Dr. Sanjai J. Parikh, Soil Chemistry

Degree completed: March 2015

B.S., Environmental Science and Policy, *Summa cum laude*, University of Maryland, College Park

Concentration: Environment and Agriculture, Minor: Soil Science

Degree completed: May 2012

TECHNICAL SKILLS

Laboratory: Soil nitrogen (N) extraction, DNA extraction, PCR and qPCR, gas chromatography, permanganate oxidizable carbon (POXC) analysis, total C and N analysis, dissolved organic C analysis, aggregate stability

Field: Field trial experimental design, soil and plant tissue sampling, crop and biomass harvesting, soil pedon morphological descriptions

Data analysis and software: Statistical analysis in R and SAS, multivariate analyses, 16S amplicon sequencing data processing and analysis, ArcGIS, SoilWeb, Web Soil Survey

RESEARCH EXPERIENCE

Graduate Student Researcher, Soil Microbial Ecology and Soil Chemistry Labs, Department of Land, Air and Water Resources, University of California, Davis, Sept 2012 – Present

Advisors: Dr. Kate M. Scow, Dr. Sanjai J. Parikh

- Evaluated the effects of walnut shell biochar on soil nitrogen (N) cycling, microbial communities, and crop yields in a long-term field experiment planted in a processing tomato-corn annual rotation
- Determined the impacts of biochars on nodulation and N fixation of cowpeas by rhizobia bacteria through greenhouse studies and modeling the sorption of rhizobial signaling compounds to biochars
- Investigating how wetting patterns in subsurface drip irrigation impact soil microbial communities, nutrient transformations, soil aggregation, and soil carbon (C) storage

Visiting Researcher, Soils Research Group, International Center for Tropical Agriculture (CIAT), Palmira, Colombia, December 2015 - March 2016

Advisor: Dr. Mirjam Pulleman

- Explored how soil microbial communities and C pools respond to incorporation of leguminous shrubs in grass pastures in tropical soils

Undergraduate Research Assistant, Nutrient Cycling and Sustainable Agriculture Lab, Department of Environmental Science and Technology, University of Maryland, Sept 2010 – Aug 2012

Advisor: Dr. Ray R. Weil

- Evaluated the effectiveness of winter-killed cover crops, including forage radish (*Raphanus sativus*) and spring oats (*Avena sativa*), in reducing nitrate leaching and suppressing weeds in corn and vegetable cropping systems in Maryland

Undergraduate Research Assistant, Small Grains Breeding and Genetics Lab, Department of Plant Sciences and Landscape Architecture, University of Maryland, June – Sept 2010

Advisor: Dr. José M. Costa

- Harvested and analyzed lines of wheat and barley seed from field trials for incidence of *Fusarium* head blight using traditional breeding methods
- Selected for scab resistant alleles in recombinant plants using DNA markers, and grew selected varieties for DNA allele reports

Undergraduate Research Assistant, Plant Conservation Genetics Lab, Department of Plant Sciences and Landscape Architecture, University of Maryland, Jan – June 2010

Advisor: Dr. Maile C. Neel

- Analyzed the vigor of several varieties and hybrids of *Vallisneria americana*, a plant native to the Chesapeake Bay, to determine suitability for ecosystem restoration

AGRICULTURAL EXTENSION EXPERIENCE

Promoting soil science education to combat erosion and improve yields, Lilongwe, Malawi, Horticultural Innovation Lab Trellis Fund Project, Jan – July 2015

- Represented UC Davis for this USAID-funded project focused on farmers in the Khundi village in rural Lilongwe, Malawi and in collaboration with the Kusamala Institute of Agriculture and Ecology
- Collaborated to conduct a needs assessment to detail soil-related challenges, perceptions, and potential solutions related identified by farmers
- Developed a soil science curriculum for a 3-day training given to a group of 30 farmers, focusing on interactions between soil properties and crop growth, identification of suitable practices that can improve soil health in their systems, and use of simple tests as indicators for soil quality

TEACHING EXPERIENCE

Guest Lecturer, Introduction to Soil Science, UC Davis, Nov 2017

- Lectured on the C and N cycles, microbial respiration, redox reactions for a class of 145 students

Guest Lecturer, Edible Landscape Internship Program, UC Davis, Nov 2016

- Lectured and developed hands-on activities on principles of soil ecology and the importance of soil health in agriculture for a group of 15 students

Teaching Assistant, Science and Society: Soil, Water, and Civilizations, UC Davis, March 2014 – June 2014

- Sole TA for 70 students; Assisted in leading discussions; Graded assessments and essays.

Teaching Assistant, Soil Microbiology Lecture and Laboratory, UC Davis, Jan 2014 – March 2014

- Sole TA for 45 students; Set up and taught two weekly laboratory sections, gave several lectures and led discussions, held office hours, graded assessments and lab reports, helped in designing curriculum.

Guest Lecturer, Sustainability and Agroecosystem Management, UC Davis, April 2014

- Lectured on the impacts of biochars on soil microbial ecology and nutrient cycling in agricultural systems for a class of 50 students

Guest Lecturer, Science and Society: Soil, Water, and Civilizations, UC Davis, May 2013

- Lectured on the environment, society, and agriculture of Ancient Egypt for a class of 75 students

SELECTED OUTREACH and MENTORING EXPERIENCE

Mentor, Student and Landowner Education and Watershed Stewardship (SLEWS) program, Center for Land-Based Learning in Dixon, CA, 2016-2018

- Collaboration with growers, NRCS Resource Conservation Districts, and high schools to plant buffer strips of native perennials and teach students about conservation.

Co-organizer, The Latest Dirt: Research-based Innovation in Soil Health, CA Center for Urban Horticulture, UC Davis, Oct 2016

- Full-day, hands-on workshop for 100 Master Gardeners

Mentor, Department Land, Air, and Water Resources Undergraduate Mentorship Program, UC Davis, 2015

Graduate Student Representative, Soils, Wines, and Vines U.S. Congressional event, Sponsored by UC Davis and the Soil Science Society of America, July 2014

- Part of a team of 5 graduate students that met with members of the U.S. Congress to promote soil science and agricultural research

Co-organizer, Workshop for the NSF-funded InTeGrate Project, April 2014

- Interactive workshop for a project that seeks to promote Earth literacy in curricula for non-science majors

Co-creator and organizer, Soils and Biogeochemistry Career Exploration Seminar, UC Davis, 2014

- Seminar for Soils and Biogeochemistry graduate students to meet and learn from professionals from institutions including USDA-ARS, UC Cooperative Extension, USGS, state agencies, and private industry

Mentor, Scow Soil Microbial Ecology Lab. 2012-2017

- Responsible for training and mentoring several undergraduate interns and visiting scholars in the lab

PUBLICATIONS

Margenot, A.J., **Griffin, D.E.**, Alves, B.S.Q., Rippner, D.A., Li, C., Parikh, S.J. 2018. Substitution of peat moss with softwood biochar for soil-free marigold growth. *Industrial Crops and Products*. 112: 160-169.

Griffin, D.E., Wang, D., Parikh, S.J., Scow, K.M. 2017. Short-lived effects of walnut shell biochar on soils and crop yields in a long-term field experiment. *Agriculture, Ecosystems, and Environment*. 236: 21-29.

Wang, D., **Griffin, D.E.**, Parikh, S.J., Scow, K.M. 2016. Impact of biochar amendment on soil water soluble carbon in the context of extreme hydrological events. *Chemosphere*. 160: 287-292.

Griffin, D.E. 2012. Managing Abiotic Factors of Compost to Increase Soilborne Disease Suppression. *Journal of Natural Resources and Life Sciences Education*. 41: 31-34.

In prep: **Griffin, D.E.**, Mahmood, A., Scow, K.M., Parikh, S.J. Soil texture influences biochar's effects on legume-rhizobia symbiosis: potential negative effects in sandy soils.

In prep: Shackelford, G.E., Alvarez, P., Bart, J.W., Boomer, K., Bossio, D., Dicks, L.V., Felice, M., Garbach, K., Gennet, S., Gravuer, K., **Griffin, D.E.**, Jedlicka, J., Karp, D.S., Kelsey, R., Kennedy, C., Kremen, C., Kross, S., Larry, F., LeBuhn, G., Moore, T., Muñoz-Sáez, A., Rao, D.R., Reynolds, M., Seavy, N., Sutherland, W.J., Wood, S. Making decisions about agri-environment management based on Conservation Evidence.

SELECTED PROFESSIONAL PRESENTATIONS

***Extension presentations**

***How Do Wetting Patterns Created by Subsurface Drip Irrigation Impact Soil Health?** Talk presented at It's Alive! Principles and Practices to Build Soil Health on Your Farm, a workshop for 50 growers and Extension practitioners, Agricultural Sustainability Institute, UC Davis, Oct 2017.

***Putting an Economic Value on Cover Crops: Impacts on Profitability and Soil Quality in Conventional Tomato Systems.** Talk presented at the 2017 Annual Field Day for the Russell Ranch Sustainable Agriculture Facility, Agricultural Sustainability Institute, UC Davis, June 2017.

***The Deal With Biochar: The Good, the Bad, and the Uncertain.** Workshop presentation to 60 Master Gardeners, University of California Cooperative Extension, Santa Clara County, May 2017.

Short-Lived Effects of Walnut Shell Biochar in a Long-term Field Experiment. Oral presentation at ASA-CSSA-SSSA Annual Meetings, Phoenix, AZ, Nov 2016.

***Impacts of Microbes and Biochar on Soil Health.** Oral presentation at The Latest Dirt: Research-based Innovation in Soil Health. Workshop for 100 Master Gardeners, CA Center for Urban Horticulture, Oct 2016.

***How Does Biochar Impact Nutrient Cycling? Potential Effects on Nitrogen Availability, Soil Structure, and Yields.** Talk presented at the 2015 Annual Field Day for the Russell Ranch Sustainable Agriculture Facility, Agricultural Sustainability Institute, UC Davis, May 2015.

***Impacts of Biochar Amendment on Soil Nutrient Availability and Crop Growth.** Talk presented at the 2014 Annual Field Day for the Russell Ranch Sustainable Agriculture Facility, Agricultural Sustainability Institute, UC Davis, May 2014.

SELECTED POSTER PRESENTATIONS

How Do Moisture Patterns in Subsurface Drip Irrigation Impact Soil Health in Organic Systems? Poster presented at the ASA-CSSA-SSSA Annual Meetings, Tampa, FL, Oct 2017. (1st place winner in Organic Management Systems Community)

Effects of Walnut Shell Biochar on Microbial Communities and Nutrient Cycling in a Long-term Field Experiment. Poster presented at the Soil Ecology Society Meeting, Fort Collins, CO, June 2017.

Short-lived Effects of Walnut Shell Biochar in a Long-term Field Experiment. Poster presented at the American Society of Agronomy - California Chapter Annual Meeting, Fresno, CA, Jan 2017. (1st place winner in poster competition)

Effects of Biochar on Soil Microbial Communities and Nitrogen Cycling in Two California Nutrient Management Systems. Poster presented at ASA-CSSA-SSSA Annual Meetings, Long Beach, CA, Nov 2014. (1st place winner in Soil Biology and Biochemistry Division)

Interactions of Biochar with Legume-Rhizobia Symbiosis. Poster presented at ASA-CSSA-SSSA Annual Meetings, Tampa, FL, Nov 2013.

FELLOWSHIPS

Total Awarded: \$240,950

NSF Graduate Research Fellowship Program, 2014-2019 (\$102,000 stipend, \$36,000 institutional support)

Beatrice Oberly & S. Atwood McKeehan Fellowship, UC Davis, 2014-2015 (\$20,000 stipend, \$16,100 institutional support)

Bert & Nell Krantz Fellowship, UC Davis, 2013-2014 (\$1700 stipend)

Soils & Biogeochemistry Graduate Group Fellowship, 2012-2013 (\$8900 stipend, \$20,250 institutional support)

GRANTS

Total Awarded: \$292,720

Healthy Soils Program Demonstration Project, California Department of Food & Agriculture, *Co-author*, Demonstrating impacts of cover crops and compost on soil carbon and greenhouse gas emissions in irrigated tomatoes, 2017 (\$250,000)

California Tomato Research Institute Research Grant, *Co-author*, Effects of irrigation and management practices on soil health and crop properties of processing tomatoes, 2017 (\$30,000)

Trellis Fund Recipient, Horticulture Innovation Lab, UC Davis, 2015 (\$1000)

Henry A. Jastro Research Award, Soils and Biogeochemistry Graduate Group, UC Davis, 2013-2014, 2014-2015, 2016-2017 (\$7720)

Graduate Student Association Travel Award, UC Davis, 2016 (\$500)

University of California-Davis and Humanities Graduate Research Award, 2013-2014, 2015-2016 (\$3000)

Graduate Studies Travel Grant, UC Davis, 2013 (\$500)

Under review: **Specialty Crop Block Grant Program Concept Proposal**, California Department of Food & Agriculture, *Co-author*, Integrating compost into conventional processing tomatoes to improve soil health and water management, 2017 (\$295,412)

AWARDS & HONORS

1st Place Winner, Poster Competition, Organic Management Systems Community, ASA-CSSA-SSSA Annual Meeting, Tampa, FL, Oct 2017

1st Place Winner, Poster Competition, American Society of Agronomy - California Chapter Annual Meeting, Fresno, CA, Jan 2017

1st Place Winner, Poster Competition, Soil Biology and Biochemistry Division, ASA-CSSA-SSSA Annual Meeting, Long Beach, CA, Nov 2014

NSF Graduate Research Fellowship Program, Honorable Mention, 2013

University of Maryland Soil Judging Team

National Collegiate Soil Judging Competition, Morgantown, West Virginia, March 2012

- **National Champion** (1st Place) in Individual Competition
- **1st Place** in Team Competition

Northeast Regional Soil Judging Competition, Kingston, Rhode Island, Oct 2011

- **1st Place** in Team Competition
- **4th Place** in Individual Competition

Outstanding Senior, 2012 National Student Recognition Program, ASA-CSSA-SSSA

Golden Opportunity Scholar, ASA-CSSA-SSSA, 2011

- Awarded scholarship to attend ASA-CSSA-SSSA Annual Meetings in San Antonio, TX, Oct 2011
- Mentor: Dr. Carl Rosen, University of Minnesota

3rd Place Winner, Darrel S. Metcalfe Student Manuscript Contest, Students of Agronomy, Soils, and Environmental Sciences (SASES), 2011

Dean's List for Outstanding Academic Performance, University of Maryland, Consecutive semesters 2009-2012

ACADEMIC SERVICE

- **Technical Reviewer**, Healthy Soils Program – Incentives Projects, California Department of Food & Agriculture, Oct 2017
- **Hiring Committee Member**, Academic Coordinator position, Agricultural Sustainability Institute, May 2017
- **Graduate Student Representative**, Soils and Biogeochemistry Graduate Group Executive Board, 2016-2017
- **Expert Reviewer**, The Nature Conservancy, Assessment of agricultural practices for evidence of ecosystem services, 2017
- **Reviewer**, *Soil Biology and Biochemistry* journal

TRAININGS

- **Microbial Community Analysis (Amplicon community profiling)** (3-day training), UC Davis Bioinformatics Core, Sept 2017
- **Responsible Conduct of Research (RCR) Certification**, 8 trainings attended, UC Davis Office of Research, 2015-2017
- **Science Communication Workshop**, UC Davis, April 2017
- **R Boot Camp** (5-day training), UC Davis, Sept 2015

PROFESSIONAL SOCIETY MEMBERSHIP

Soil Ecology Society, 2017-Present

Soil Science Society of America (SSSA), 2011-Present

Crop Science Society of America (CSSA), 2011-Present

American Society of Agronomy (ASA), 2011-Present

Mid-Atlantic Association of Professional Soil Scientists (MAPSS), 2012-2013