

F. MITCHELL WESTMORELAND

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Education

- Ph.D.** Utah State University, *Logan UT* 2023 (expected)
Major: Plant Science
Dissertation: “Measuring and modeling yield components of *Cannabis sativa* L. in response to temperature”
- B.S.** Utah State University, *Logan, UT* 2018
Major: Biology
Minor: Chemistry
Graduated Cum Laude

Research Experience

- Graduate Research Assistant**, Utah State University 2019 – present
Overview: Conducted research on plant-environment interactions of high-value crops in controlled environments. Published in peer-reviewed journals on photobiology and plant nutrition.
- Forest Ecology Research Technician**, Western Forest Initiative 2019
Overview: Collected recruitment, growth, and mortality data on 90,000+ woody species in three Smithsonian ForestGEO-affiliated research plots.
- Biological Science Technician**, United States Department of Agriculture 2017 – 2019
Overview: Cultivated 500+ grass and forbs specimens in greenhouse and growth chambers.

Publications

(hyperlinks in blue)

- Westmoreland F. M.**, Kusuma P., & Bugbee, B. [Elevated UV photon fluxes minimally affected cannabinoid concentration in a high-CBD cultivar.](#) 2023
Frontiers in Plant Science. 14:1220585.
- Hudelson T.J., **Westmoreland F. M.**, & Bugbee, B. [Elevated atmospheric ethylene and high temperature independently inhibit fruit set but not vegetative growth in tomato.](#) 2023
HortScience, 58(3), 247-253.
- Westmoreland F.M.**, & Bugbee B. [Sustainable Cannabis Nutrition: Elevated root-one phosphorus significantly increases leachate P and does not improve yield or quality.](#) 2022
Frontiers in Plant Science. 13:1015652.
- Webb C., **Westmoreland F.M.**, Bugbee, B., & Qi X. [Far-red photography for measuring plant growth: a novel approach.](#) 2022
Techniques and Instruments. USU Digital Commons. Paper 20.

- Westmoreland F.M.**, Kusuma P., & Bugbee B. [Cannabis lighting: Decreasing blue photon fraction increases yield but efficacy is more important for cost-effective cannabinoid production](#). *PLOS ONE*. 16(3): e0248988 2021
- Kusuma P., **Westmoreland F.M.**, Zhen S., Bugbee B. [Photons from NIR LEDs can delay flowering in short-day soybean and Cannabis: Implications for phytochrome activity](#). *PLOS ONE*. 16(7): e0255232. 2021
- Yost M., Baker M., **Westmoreland F.M.**, Sullivan T., Gale J., Zesiger C., Creech E., Bugbee B. [Ten frequently asked questions about growing Cannabis](#). USU Extension Fact Sheet 2021

Invited Talks

(hyperlinks in blue)

- Crop steering for yield and quality: time to talk temperature** 2023
Cannabis Business Times Cannabis Conference, *Las Vegas, NV*
- [Optimizing yield and quality of medical Cannabis with temperature](#) 2023
UConn Cannabis Symposium, *University of Connecticut, Storrs, CT*
- [Phosphorus fertilization: An environmentally responsible approach](#) 2022
Institute of Cannabis Research, *Colorado State University Pueblo, Pueblo, CO*
- [Optimizing lighting for Cannabis cultivation](#) 2021
Cannabis Business Times Cannabis Conference, *Las Vegas, NV*
- [Phosphorus fertilization: An environmentally responsible approach](#) 2020
Cannabis Business Times Cannabis Conference, *Las Vegas, NV*
- Efficacy is more important than spectra for cost-effective production of cannabinoids in controlled environments** 2020
Cannabis Business Times Cannabis Conference, *Las Vegas, NV*

Conference Presentations

(hyperlinks in blue)

- Day and night temperature for yield and quality of Cannabis** 2023
American Society of Horticultural Science Conference, *Orlando, FL*
- [Canopy gas exchange system to quantify yield components of Cannabis](#) 2023
NCERA-101 Annual Meeting, *Davis, CA*
- [Phasic temperature control to optimize growth, development, and quality of medical Cannabis](#) 2022
American Society of Horticultural Science Conference, *Chicago, IL*
- Cannabis propagation: Unique challenges and opportunities to improve rooting** 2022
American Society of Horticultural Science Conference, *Chicago, IL*
- [The unique accumulation of phosphorus in unfertilized Cannabis flower](#) 2021
American Society of Horticultural Science Conference, *Denver, CO*
- Phosphorus fertilization: An environmentally responsible approach** 2021
Utah State University Extension Hemp Seminar *Salt Lake City, UT*
- [Hemp research updates at Utah State University](#) 2020
Utah State University Extension Hemp Seminar, *Salt Lake City, UT*

High light, high oxygen, and high CO₂ to improve rooting of *Cannabis* 2019
HortCon. Springfield, TN

Teaching Experience

(hyperlinks in blue)

Instructor, Utah State University, *Logan, UT* 2021 – present

PSC 4900: The Science of Medical *Cannabis* Cultivation

Overview: Developed and taught three semesters of the first on-campus course at Utah State University focused on the physiology and cultivation of medical *Cannabis* in controlled environments.

Instructor, Utah State University, *Logan, UT* 2021 – present

USU Online: [The Science and Technology of Medical *Cannabis* Cultivation](#)

Overview: Co-developed and taught two editions of the first online course through Utah State University Online to 500+ students from across the world. [Link to selected recorded lectures.](#)

Public Outreach

(hyperlinks in blue)

[Cracking the lighting code](#) 2022

Cannabis Business Times State of the Cannabis Lighting Market, *Las Vegas, NV*

[Cannabis on campus: A look into Utah State University's research into a long-prohibited plant](#) 2022

Utah State Today, Utah State University, *Logan, UT*

[Growing Cannabis under high light intensities](#) 2021

Cannabis Business Times State of the Cannabis Lighting Market, *Las Vegas, NV*

[Does hemp need extra water and fertilizer?](#) 2020

Utah State University Extension, *Logan, UT*

[Industrial hemp in Utah as a high value crop for CBD oil](#) 2020

The County Seat, ABC4 Utah, *Salt Lake City, UT*

[How much could hemp benefit from supplemental light?](#) 2020

Greenhouse Product News, *Sparta, MI*

[Cannabis smokescreens: USU researchers debunk myths to find optimal hemp growth](#) 2020

Herald Journal News, *Logan, UT*

[Once-outlawed hemp is being cultivated in Cache Valley](#) 2019

Cache Valley Daily, *Logan, UT*

Awards

First place, [NCERA-101](#) Student Lightning Talks 2023

University of California Davis, *Davis, CA*

Department of Plants, Soils, and Climate, Graduate Student Teacher of the Year 2023

Utah State University, *Logan, UT*

Professional Memberships

Sigma Xi, The Scientific Research Honor Society

2021 – present

American Society for Horticultural Sciences

2019 – present