

Tai McClellan Maaz
College of Tropical Agriculture and Human Resources
Department of Tropical Plant and Soil Sciences
FTE Distribution: 70% R, 30% I

Education

<u>Degree</u>	<u>University</u>	<u>Major</u>
BS	University of Hawai'i at Mānoa	TPSS
MS	University of Hawai'i at Mānoa	TPSS
PhD	Washington State University	Soil Science

Professional Appointments

<u>Title</u>	<u>Employer</u>	<u>Dates Employed</u>
Assistant Researcher	University Hawai'i at Mānoa	2021-present
Junior Researcher	University Hawai'i at Mānoa	2019-2021
Nitrogen Program Director	IPNI	2017-2019
USDA Postdoctoral Fellow	Washington State University	2015-2017

Courses Taught

<u>Course ID</u>	<u>Credits</u>	<u>Semester/Year</u>	<u>No of Students</u>
TPSS 499	1	Fall 2024	1
EDEP 601	3	Fall 2024	16
TPSS 333	3	Fall 2024	3
TPSS 654	1	Fall 2024	8
TPSS 667	1	Fall 2024	20
TPSS 450/650	4	Spring 2024	11
TPSS 654	1	Fall 2023	10
TPSS 450/650	4	Spring 2023	6
TPSS 654	1	Fall 2022	14
TPSS 450/650	4	Spring 2022	10
TPSS 304L	2	Fall 2021	40
TPSS 450	4	Spring 2021	7
TPSS 650	4	Fall 2019	6
TPSS 450	4	Spring 2020	9

Publications (last 5 years)

Refereed Journal Publications

*Student or postdoc

**Corresponding Author

Beckstrom, T.B.*, A. Bunnell*, **T.M. Maaz****, M.B. Kantar, J.L. Deenik, C. Tallamy Glazer, P. Sadowski, S.E. Crow. Accepted. Mid-infrared Spectroscopy and Machine Learning Improve Accessibility of Hawai'i Soil Health Assessment. Soil Science Society of America Journal.

Maaz, T.M., A. Dobermann, S.E. Lyons, A. Thomson. In press. Review of research and innovation on novel fertilizers for crop nutrition. npj Sustainable Agriculture 10.1038/s44264-025-00066-0

Halpin-McCormick, A.*, **T.M. Maaz**, M.B. Kantar, K.E. Barton, R.R. Masalia, N. Batora, K. Law, K. and E.J. Kuntz. 2025. Species distribution of Cannabis sativa: Past, present and future. PloS one, 20(3), p.e0306007.

Beckstrom, T.B.*, **T.M. Maaz**, J.L. Deenik, H. Peter-Contesse, A. Koch, C. Tallamy Glazer, J. Rivera-Zayas, and S.E. Crow. 2025. From volcanic ash to abundant earth: understanding Andisol organic matter dynamics in relation to soil health on Hawai'i Island. Biogeochemistry, 168(2), p.22.

- Tamagno, S.*, **T.M. Maaz**, C. van Kessel, B.A. Linquist, J.K. Ladha, M.E. Lundy, F. Maureira, and C.M. Pittelkow. 2024. Critical assessment of nitrogen use efficiency indicators: Bridging new and old paradigms to improve sustainable nitrogen management. *European Journal of Agronomy*, 159, p.127231.
- Jungers, J., P. Ewing, B. Runck, **T. Maaz**, N. Fumia, C. Carlson, J. Neyhart, M. Hunter, S. Subedi, S. Senay, P. Bajgain, V. Sharma, C. Cureton, J. Gutknecht, M. Kantar. 2023. Adapting Perennial Crops for Climate Resiliency. *Crop Science*.
- Blenis, N*. N. Hue, **T. M. Maaz**, M. Kantar. 2023. Biochar production, modification, and its uses in soil remediation: A review. *Sustainability*. 15 (4), 3442. doi.org/10.3390/su15043442
- Maaz, T. M.**, R. Heck, C. T. Glazer, M.K. Loo, J. Rivera-Zayas, T. Beckstrom, S.E. Crow, J.D. Deenik. 2023. Measuring the unmeasurable: A structural equation modeling approach to assessing soil health. *Science of the Total Environment*. 870. 10.1016/j.scitotenv.2023.161900.
- Crow, S.E., H.L. Hubanks, J.L. Deenik, **T. McClellan Maaz**, C.T. Glazer, E.V. Vizka, J. Rivera Zayas. 2023. Dynamic soil health properties reveal legacy of intensive agriculture in tropical natural and working landscapes. *Frontiers in Environmental Science*. Available: DOI 10.3389/fenvs.2022.991262.
- McClellan Maaz, T.**, N. Nguyen, A. Del Valle Echevarria, M. Kantar, Y. Mileyko, M. Muszynski. 2022. A cohort-based undergraduate research experience in the agricultural sciences. *Natural Science Education*.
- Heisey, S.*, R. Ryals, **T. McClellan Maaz**, N.H. Nguyen. 2022. Complex, high-nitrogen fertilizers can leave lasting impacts and alter cross-domain interaction networks.
- York, L.M., M. Griffiths, **T. McClellan Maaz**. 2022. Whole-plant phenotypic engineering: Moving beyond ratios for multi-objective optimization of nutrient use efficiency. *Current Opinion in Biotechnology*.
- Udvardi, M., F.E. Below, M. Castellano, A. Eagle, K. Giller, J. Ladha, X. Liu, **T. McClellan Maaz**, P. Robertson, M. Saha, S. Schmidt, M. Tegeder, L. York, J. Peters. 2021. A research road map for sustainable nitrogen use in agriculture. *Frontiers in Plant Sciences*. doi.org/10.3389/fsufs.2021.660155
- Zhang, X., L. Lassaletta, T. Zou, N.D. Mueller, F.N. Tubiello, M. D. Lisk, C. Lu, R.T. Conant, C.D. Dorich, J. Gerber, H. Tian, T. Bruulsema, **T. M. Maaz**, K. Nishina, B. L. Bodirsky, A. Popp, L. Bouwman, A. Beusen, J. Chang, P. Havlík, D. Leclère, J. G. Canadell, R. B. Jackson, G. Billen, P. Heffer, N. Wanner, W. Zhang, E. A. Davidson. 2021. Quantifying and evaluating nitrogen budgets for crop production at global and national scales. *Nature Food*. doi.org/10.1038/s43016-021-00318-5
- McClellan Maaz, T.**, J.L. Deenik, W.L. Hockaday. 2021. Biochar volatile matter and feedstock effects on soil nitrogen mineralization and soil fungal colonization. *Sustainability*. 13 (4): 2018. doi.org/10.3390/su13042018
- McClellan Maaz, T.M.**, Sapkota, T.B., Kantar, M.B., Eagle, A.J., Bruulsema, T.B., and Majumdar, J. 2021. Meta-analysis of yield and nitrous oxide outcomes for nitrogen management in agriculture. *Global Change Biology*. doi.org/10.1111/gcb.15588
- Eagle, A.J., E.L. McLellan, E. M. Brawner, M.H. Chantigny, E.A. Davidson, D.E. Pelster, C.M. Pittelkow, C. van Kessel, **T. McClellan Maaz**, T.J. Vyn, J.B. Dickey, B. Linquist, K. G. Cassman. 2020. Quantifying On-farm Nitrous Oxide Emission Reductions in Food-Supply Chains. *Earth's Future*. doi.org/10.1029/2020EF001504

Graduate Students (Most recent year only)

Category	Number of Students	Number that Graduated
Chair of Master Committees	1	1
Chair of PhD Committees	1	0
Member of Master Committees	2	4
Member of PhD Committees	3	2

Grant Support (Active)

Title of Grant: “Investigating short range order material as a DSP and its capacity to stabilize SOC, SRO/SOC dynamics in a warming ecosystem.”

Source of Grant: USDA-NRCS

Dollar Value: \$499,553.00

Dates of Grant: 10/01/2023-12/01/2027

Role: co-PI

Title of Grant: “Soil health fingerprinting: Rapidly predicting soil health in a diversity of soils using machine learning.”

Source of Grant: USDA-NIFA

Dollar Value: \$649,570

Dates of Grant: 9/2023 – 9/2028.

Role: PI

Title of Grant: “Hawai‘i climate smart commodities: A portfolio approach to equitably scaling the agriculture sector.”

Source of Grant: USDA-NRCS.

Dollar Value: \$10,000,000

Dates of Grant: 1/2023 – 12/2028

Role: co-PI

Title of Grant: “Fungal-Bacterial Interactions: Bridging soil niches in regulating carbon and nitrogen processes”

Source of Grant: US Department of Energy

Dollar Value: \$3,400,000

Dates of Grant: 10/1/2022 – 9/30/2025

Role: Key Personnel

Title of Grant: “Provide Analytical Services, Laboratory Consultation, and Analytical Methodologies Assistance”

Source of Grant: Hawai‘i Department of Health, Hazard Evaluation and Emergency Response

Dollar Value: \$508,176.00

Dates of Grant: 05/01/2022 – 04/30/2027

Role: PI

Title of Grant: “An Emergent Soil Health Framework for Agroecosystems in Underrepresented Tropical/Subtropical Islands or Regions”

Source of Grant: National Institute of Food and Agriculture

Dollar Value: \$499,323.00

Dates of Grant: 02/05/2021 – 02/14/2024

Role: Co-PI

Title of Grant: “Producer-Driven Implementation of Soil Health Management Systems Adapted to Diverse Cropping Systems in Tropical and Subtropical Island Regions”

Source of Grant: Natural Resources Conservation Service

Dollar Value: \$1,961,218.00

Dates of Grant: 05/01/2021 - 04/30/2024

Role: Co-PI

Presentations at Conferences

*Student or postdoc

Title: CTAHR Introduces New Tools and Programs to Help Farmers: Hawai‘i Soil Health Tool.

Authors: **Maaz, T.M.**

Name of Conference: Hawai‘i Ag2024 Conference. Honolulu, HI.

Date of Presentation: 2024

Title: Connecting Fungal-Bacterial Interactions and Soil Health in Tropical Soils
Authors: Slanzon, G.*, **McClellan Maaz, T.**, Crow, S. E., Deenik, J. L., Kantar, M., & Nguyen, N.
Name of Conference: ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX.
Date of Presentation: 2024

Title: Measuring the Immeasurable: A Structural Equation Modeling Approach to Conceptualizing and Scaling up Soil Health Assessments
Authors: **McClellan Maaz, T.**, Crow, S. E., Deenik, J. L., Loo, K., Tallamy-Glazer, C. J., & Beckstrom, T. B.*
Name of Conference: ASA, CSSA, SSSA International Annual Meeting, St. Louis, MO.
Date of Presentation: 2023

Title: Critical Assessment of N Use Efficiency Indicators: Bridging New and Old Paradigms to Improve Sustainable N Management
Authors: Tamgano S.*, **McClellan Maaz, T.** C. Van Kessel, B. Linquist, J.K. Ladha, M. Lundy, C. M. Pittelkow
Name of Conference: ASA, CSSA, SSSA International Annual Meeting
Date of Presentation: 2022
Abstract #241-1

Title: Corn Belt Nutrient-Loss Mitigation Guided By Multi-Site Research Network Testing Environmental and Production Synergies and Tradeoffs
Authors: Eagle, A. J., **McClellan Maaz, T.**, & Abendroth, L. J.
Name of Conference: ASA, CSSA, SSSA International Annual Meeting
Date of Presentation: 2022
Abstract #311-9

Poster Presentations

Title: Unearthing Trends: Optimizing Tropical Soil Health Scoring Methods
Authors: Shor, H.*, Beckstrom, T. B.*, Estrada, K.*, **McClellan Maaz, T.**, Deenik, J. L., Reyes, N.*, Mix, S., Loo, M. K., Sotomayor, D., Lawrence, D., Tallamy Glazer, C. J., & Crow, S. E.
Name of Conference: ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX.
Date of Presentation: 2024

Title: The Dirt on Disturbance: Creating an Anthropogenic Disturbance Index to Objectively Capture Overlap across and within Land Use Types for Tropical and Subtropical Agroecosystems
Authors: Estrada, K.*, **McClellan Maaz, T.**, Beckstrom, T. B.*, Deenik, J. L., Reyes, N.*, Mix, S., Loo, M. K., Tallamy Glazer, C. J., Satdichanh, M., Lawrence, D., Rivera Zayas, J., Ticktin, T., Sotomayor, D., & Crow, S. E.
Name of Conference: ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX.
Date of Presentation: 2024

Title: Assessing (sub)Tropical Soil Health Along a Disturbance Gradient in Hawai'i, Puerto Rico, and Pohnpei
Authors: Beckstrom, T. B.*, Estrada, K.*, **McClellan Maaz, T.**, Deenik, J. L., Reyes, N.*, Mix, S., Loo, M. K., Sotomayor, D., Lawrence, D., Tallamy Glazer, C. J., & Crow, S. E.
Name of Conference: ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX.
Date of Presentation: 2024

Title: A Microbial Proxy for Mineralizable Nitrogen
Authors: Kiehl, K. D.*, Fullmer, C., Nguyen, N., **McClellan Maaz, T.**, Crow, S. E., & Deenik, J. L.
Name of Conference: ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX.
Date of Presentation: 2024

Title: How disturbing: The effects of anthropogenic disturbance on soil health and productivity.
Authors: Estrada, K.*, Beckstrom, T.B.*, **Maaz, T. M.**, Deenik, J. L., Reyes Perez, N.*, Loo, M.K., Tallamy Glazer, C., Satdichanh, M., Rivera-Zayas, J., Ticktin, T., Sotomayor-Ramírez, D., Crow, S.E.
Name of Conference: ASA, CSSA, SSSA International Annual Meeting, San Antonio, TX.

Date of Presentation: 2024

Title: Insights from Machine Learning with Mid-Infrared Spectroscopy in Hawaii Soil Health Modeling and Assessment

Authors: Beckstrom, T. B. **, **McClellan Maaz, T.**, Kantar, M. B., Deenik, J. L., Tallamy-Glazer, C. J., Chen, Q., & Crow, S. E.

Name of Conference: ASA, CSSA, SSSA International Annual Meeting, St. Louis, MO.

Date of Presentation: 2023 **won graduate student competition

Title: Soil Protein: A Replacement for PMN?

Authors: Kiehl, K*. D., Loo, M. K., Tallamy-Glazer, C. J., **McClellan Maaz, T.**, Crow, S. E., & Deenik, J. L.

Name of Conference: ASA, CSSA, SSSA International Annual Meeting, St. Louis, MO.

Date of Presentation: 2023

Title: A Mixed Methods Approach to Understanding Soil Genesis: The Pu'u 'ōhi'a Soil in Mānoa, Hawai'i

Authors: Izumi Lam, K. *, Crow, S. E., Keali'ikanaka'ole, K., Kalua, M., Navales, P. K. K., Navales, N. J., Deenik, J. L., Creswell, J. W., Kantar, M., **McClellan Maaz, T.**, Enos, K., Zane, K., Lewis, J. E., Richardson, D., & Beckstrom, T. B.

Name of Conference: ASA, CSSA, SSSA International Annual Meeting, St. Louis, MO.

Date of Presentation: 2023

Title: Deep Fungi: Soil depth structures fungal communities in a tropical volcanic soil.

Authors: Fullmer, C*, **T. McClellan Maaz**, C. McGrath, S. Crow, N.H. Nguyen.

Name of Conference: Mycological Society of America. Gainesville, FL.

Date of Presentation: 2022

Webinars

Title: Compost course: Week 1

Speakers: Kyle Barber and **Tai Maaz**

Webinar: GoFarm Hawai'i

Date of Presentation: 2024

Title: A producer-driven implementation of soil health practices in tropical and subtropical regions

Speakers: Jonathan Deenik, Susan Crow, **Tai Maaz**, Johanie Rivera-Zayas, Mitch Loo

Webinar: University of Hawai'i Extension

Date of Presentation: 2022

Title: Identifying Research Gaps to Improve Sustainability Measurement and Benchmarking for U.S. Agriculture

Speaker panel: Tomer, M., T. **M. Maaz**, E. Spevak

Webinar: Field to Market

Date of Presentation: 2020

Title: Hawai'i Soil Health

Speaker panel: Deenik, J.D., E.V. Vizka, S. E. Crow, **T. M. Maaz (facilitator)**, J. Rivera-Zayas (rapporteur).

Webinar: University of Hawai'i Extension

Date of Presentation: 2020

Title: Greenhouse gas emissions metric update: Exploring 4R nutrient stewardship impacts on N₂O emissions

Speaker panel: B. Hohenstein, T. **M. Maaz**, T., Lexi Clarke

Webinar: Field to Market

Date of Presentation: 2020

Title: Identifying Research Gaps to Improve Sustainability Measurement and Benchmarking for U.S. Agriculture

Speaker panel: Tomer, M., T. **M. Maaz**, E. Spevak

Webinar: Field to Market

Date of Presentation: 2020