

**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

**Courses Taught**

<u>Course ID</u>	<u>Credits</u>	<u>Semester/Year</u>	<u>No of Students</u>
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

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](https://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](https://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](https://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](https://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](https://doi.org/10.1029/2020EF001504)

**McClellan Maaz, T.**, S. Waldo, T. Bruulsema, R. Mikkelsen. 2018. Inconsistencies undermine the conclusion that agriculture is a dominant source of NO<sub>x</sub> in California. *Science Advances*. DOI: [10.1126/sciadv.aat4706](https://doi.org/10.1126/sciadv.aat4706)

Beard, T., **T. McClellan Maaz**, K. Borelli, J. Harsh, W. Pan. 2018. Nitrogen impacts wheat and canola silica accumulation, soil silica forms, and crusting. *Journal of Environmental Quality*. doi: [10.2134/jeq2018.01.0052](https://doi.org/10.2134/jeq2018.01.0052).

**McClellan Maaz, T.**, J.D. Wulfhorst, V. McCracken, J. Kirkegaard, D.R. Huggins, I. Roth, H. Kaur, W.L. Pan. 2018. Economic, policy, and social trends and challenges of introducing oilseed and pulse crops into dryland wheat rotations. *Agriculture, Ecosystems, and Environment*. 253: 177-194. DOI:[10.1016/j.agee.2017.03.018](https://doi.org/10.1016/j.agee.2017.03.018)

#### Non-refereed Journal Publications

**McClellan Maaz, T.** 2018. Fertilizers and manure complement each other. *CropLife*.

**McClellan Maaz, T.** 2018. Can stabilized nitrogen fertilizer sources reduce losses through multiple loss pathways? *Crop and Soils Magazine*.

**McClellan Maaz, T.**, T. Brown, A. Glover, E. Brooks. 2018. Nitrogen balances can help fine-tune nitrogen management. *Crops and Soils Magazine*.

**McClellan Maaz, T.**, R. Omonode, T. Vyn. 2018. Part 1: Can lower nitrogen balances and great recovery by crop reduce N<sub>2</sub>O emissions? *Better Crops*. 102 (2): 27-30.

**McClellan Maaz, T.** and A. Eagle. 2018. Part 2: Effects of 4R management, climate, and soil type on N losses. *Better crops*. 102 (3): 15-17.

**McClellan Maaz, T.** and C. Snyder. 2018. Part 3: Identifying of management strategies that target multiple loss pathways. *Better crops*. 102 (4).

**McClellan Maaz, T.** 2018. Plant proteins, gluten, and nitrogen. *Plant Nutrition Today*. Issue 3. *Downloads: 364*.

**McClellan Maaz, T.** 2018. What we should be saying when we talk about nitrous oxide emissions. Plant Nutrient Today. Issue 2. No 1. *Downloads: 391.*

**McClellan Maaz, T.** 2018. How enhanced-efficiency nitrogen fertilizer can work for you. Plant Nutrition Today. Issue 1. No 2. *Downloads: 711.*

### **Graduate Students (Most recent year only)**

<u>Category</u>	<u>Number of Students</u>	<u>Number that Graduated</u>
Co-Chair of Master Committees	2	0
Chair of PhD Committees	0	0
Member of Master Committees	3	2
Member of PhD Committees	4	0

### **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 Conservational Service  
Dollar Value: \$1,961,218.00  
Dates of Grant: 05/01/2021 - 04/30/2024  
Role: Co-PI

### **Presentations at Conferences**

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 (put an asterisk on the presenter): 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 (put an asterisk on the presenter): 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

Title: 4R systems and nutrient management in North America  
Authors (put an asterisk on the presenter): **McClellan Maaz, T.\*** and L. Moody  
Name of Conference: ASA, CSSA, SSSA International Annual Meeting Date of Presentation: 2019  
Abstract #108-2

Title: Nitrogen balances can help fine tune nitrogen management for wheat.  
Authors: **McClellan Maaz, T.\***  
Name of Conference: South Dakota Agri-Business Association  
Date of Presentation: 2018

Title: Better nitrogen management starts with 4R nutrient stewardship research. Special Sessions: From field research to on-farm application to public policy: CCA opportunities in 4R Nutrient Stewardship  
Authors: **McClellan Maaz, T.\***  
Name of Conference: ASA, CSSA, SSSA International Annual Meeting  
Date of Presentation: 2018  
Abstract #138-2.

Title: Assessing nitrogen management in corn for nitrous oxide emissions: How Field to Market is approaching the challenge  
Authors: Johnson, L.\* , **T. McClellan Maaz**, C. A. Shapiro, L. B. Moody, C.S. Snyder  
Name of Conference: ASA, CSSA, SSSA International Annual Meeting  
Date of Presentation: 2018  
Abstract # 247-5

Title: Update on N<sub>2</sub>O emissions in Field to Market’s Fieldprint calculator  
Authors: **McClellan Maaz, T.,\*** L. Johnson, C. Shapiro  
Name of Conference: Field to Market

Date of Presentation: 2018

Title: Site-specific nitrogen management: Balancing agronomic and environmental goals

Authors: **T. McClellan Maaz\***

Name of Conference: AgriAnalytics Days, Ben Guerir, Morocco.

Date of Presentation: 2018

Title: Enhanced efficiency nitrogen fertilizers: the what, when, and where

Authors: **McClellan Maaz, T.\*** and L. Moody

Name of Conference: ASA, CSSA, SSSA International Annual Meeting

Date of Presentation: 2018

Abstract #108-2

Title: Meeting our nitrogen needs while protecting water quality: sources and solutions

Authors: **McClellan Maaz, T.\***

Name of Conference: Alberta Agronomy Updates

Date of Presentation: 2018

## **Poster Presentations**

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: 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 nitrous oxide 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