MEYER P. BOHN, PH.D.

227 Hilltop Rd Ames, IA 50014

University E-mail: mpbohn@iastate.edu | personal E-mail: bohn2022@gmail.com

Mobile Phone: +1 (701) 220-5166

Website: https://glsi.agron.iastate.edu/

EDUCATION	DATE
PH.D., SOIL MORPHOLOGY AND GENESIS **IOWA STATE UNIVERSITY, AMES, IA** Graduate certificate in data-driven, food, energy, and water decision-making Advised by Bradley A. Miller, Associate Professor of soil science Dissertation: Precision Land Surface Analysis and Machine Learning for Enhanced Soil Maps: Strengthening the Foundation for Agroecosystems Research	2018 - 2022
M.S., SOIL SCIENCE **NORTH DAKOTA STATE UNIVERSITY FARGO, ND** Advised by David G. Hopkins, Associate Professor of soil science Thesis: Predicting Soil Health and Function of the Barnes Catena Using Evapotranspiration, Vegetative, Geologic, and Terrain Attributes in the Eastern Glaciated Plains of North Dakota	2016 - 2018
B.S., ENVIRONMENTAL SCIENCE **DICKINSON STATE UNIVERSITY DICKINSON, ND** Minors in chemistry and earth science GPA: 3.88 Magna Cum Laude Advised by Eric C. Brevik, Professor of Geology and Soils	2011 - 2015

PROFESSIONAL EXPERIENCE

POST-DOC AT GEOSPATIAL LABORATORY FOR SOIL INFORMATICS (GLSI) IOWA STATE UNIVERSITY, AMES IA

2022 - PRESENT

- Primary Researcher for USDA-NRCS Soil Science Collaborative Research Grant – "Change Detection in Soil Organic Carbon Stocks"
- Implemented advanced GIS programming and automation to develop a "BIG DATA" environmental covariate stack for the Cornbelt (40+ TB); includes digital terrain attributes, remote-sensing, climate, soils, and geologic spatial data.
- Developed protocols and training materials to rescue legacy paper documents with soils data for synthesis with an NRCS national database.
- Mined, curated, and cleaned large agronomic soils datasets from national databases for training machine learning algorithms to produce retrospective legacy maps of soil organic carbon stocks and detect changes in Carbon.

GRADUATE ASSISTANT AT GLSI

2018-2022

- Found that bottom-up digital soil property mapping is more accurate and precise than traditional soil survey (gSSURGO); created maps for North Central Iowa.
- Evaluated validation methods for properly determining digital soil map accuracy.
- Mapped a suite of agronomic soil properties to 2-m depth at the plot-scale and determined which were easiest to predict.
- Determined the impact of on-site digital soil map inputs versus gSSURGO inputs on agroecosystem modelling predictions.
- Investigated accuracy of various ensemble machine-learning methods and spatially quantifying uncertainty to estimate topsoil thickness.
- Created immense high-resolution environmental covariate stack for state of Iowa – digital terrain attributes, remote-sensing, climate, soils (12TB).
- Invented a floodplain delineation algorithm.
- Developed digital soil mapping lab protocols and programming materials for geospatial analysis and machine learning in R, Python, and Javascript.

- Coded USDA-NRCS soil database mining, cleaning, and harmonization methods for lab implementation.
- Created training materials and coded toolboxes for USDA-NRCS gSSURGO data acquisition and [soil property mapping.](#)
- Operated and maintained various soil sampling equipment such as a Giddings hydraulic probe, handheld gas-powered probes, hand probes and augers.
- Operated and maintained soil laboratory equipment including Malvern Mastersizer 3000, LOI furnace, and other soil sample preparatory equipment.
- Communicated with scores of individuals (e.g. farmers, landowners, agronomists, county extension agents, etc.) to gain permission to sample.

GRADUATE ASSISTANT AT HOPKINS LAB, NDSU   2016 - 2018

- Investigated major soil morphologic, chemical, and physical properties integral to soil health and function of the eroded Barnes soil series.
- Developed specialized crop evapotranspiration, digital terrain attributes, and other remote-sensed spatial data for prediction of soil health properties.
- Operated soil sample preparatory equipment and laboratory equipment such as high-temperature combustion carbon analysis, pH and EC meters, hydrometer particle size analysis.
- Communicated with over 100 individuals to gain permission to sample
- Completion of the [Isee Soils Database](#) for the North Central   2017 - 2018
  Region – North Dakota
  - USDA-NRCS. $100,000 (Amount to D. Hopkins/M.Bohn: ~ $8,000).
  - Collaborators: D. Schulze, J. Crum, D. Hopkins, N. Jelinski, D. Malo, P. Quackenbush, M. Ransom, J. Turk

TEACHING EXPERIENCE	DATE
• CRP 454 Fundamentals of Remote Sensing and Spatial analyst (ISU) o Term Faculty Lecturer	SPRING 2024
• Northeast Research and Demonstration Farm Annual Fall Field Day o Soil pit demonstration and soil genesis of the Iowan Erosion Surface with extension researchers, cooperators, and local farmers.	31 AUG 2023
• Soil Judging, Interim Head Coach, ISU o Qualified for Nationals; 3rd at Region V	FALL 2022
• Soil Judging, Assistant Coach, ISU	2019 - 2023
• AGRON 665 (ISU): Digital Soil Mapping Teaching assistant o Created coded laboratory modules for accessing public geospatial data in Google earth engine and prediction with machine-learning and mapping in R.	SPRING 2021 & 2023
• **Bohn, M.P.** and J. Schultz. DIY Rainfall Erosion Simulator. Iowa Learning Farms Cyclones Soil Health Sweepstakes.	14 APR 2021
• Research Mentor; ISU Honors Program, *First-Year Mentor Program* o Guided undergraduates in conducting research and taught scientific principles	2018 - 2020
• Iowa State Soil Water Conservation Club o Guest lecture on digital soil mapping	SEP 2020
• AGRON 182 (ISU): Intro to Soils o Guest lecture on soil spatial variability in Iowa	NOV 2020
• AGRON 493 (ISU): Intro to Data Science for Digital Agriculture o Guest lecture on accessing public soils data	NOV 2019
• 2-week soils field course (NDSU) o Graduate teaching assistant in soil genesis	SUMMER 2017&2018

SERVICE	DATE

PROFESSIONAL AND INSTITUTIONAL

• DataFEWSion Graduate Traineeship, ISU
    o Served as seminar planning subcommittee
    o Designed interdisciplinary collaborative course
    o Attended and gave trainings on data analytics, professional development, and communications
	2020 – 2022

- Agronomy Graduate Student Club, ISU   2018-2021
    - President   2020
        - Hosted and coordinated events for speaker, 27 JAN 2020
          Nobel Laureate, Richard Roberts
        - Host of Q&A for World Food Prize Winner,   12 OCT 2020
          Rattan Lal
        - Coordinated events, awards, and symposia   2019
    - Social Chair
        - Planned monthly social events
- Soil Science Society of America   2016-NOW
    - Membership retention task force   2017-2018
    - Congressional Visit Days; Political advocacy   MAR 2017
      campaigning for federal funding of agricultural
      research programs like AFRI. Visited with
      congressional members and/or staffers.
      Washington, DC.
- GAMMA SIGMA DELTA – Agricultural Honor Society, NDSU   2017
  chapter

COMMUNITY

- Food at First   2020-NOW
    - Prepared and served free meals to less fortunate
      monthly
    - Built kitchen garden fence
- Science night at Sawyer elementary   24 JAN 2023
    - Soils demonstrations for K-5 students
- McKinley Elementary 1st grade soils demo   APR 2018
- Northern Cass 6th Grade soils speaker   28 JAN 2016
    - Taught three class periods about soils and provided
      learning activities

PUBLICATIONS   DATE

REFEREED

- **Bohn, M.P.,** and B.A. Miller. Locally enhanced digital soil   2024
  mapping in support of a bottom-up approach is more
  accurate than conventional soil mapping and top-down
  digital soil mapping. Geoderma.
  https://doi.org/10.1016/j.geoderma.2024.116781.
- Wu, W., W. A. Norvell, D. G. Hopkins, G. Christakos, **M. P.**   2018
  Bohn, and J. Wu. 2018. Spatial Distribution of Cadmium

and Zinc in Soils of Northern North Dakota. Agron. J. 110:1666-1680. doi:10.2134/agronj2017.08.0503

- **Bohn, M.P**. and B.A. Miller. Accuracy of Digital Soil Mapping by Machine Learning in Prediction of Agronomic Soil Properties at Depth. (To be submitted to Soil Science Society of America Journal).

- **Bohn, M.P**., B.A. Miller, and F. Miguez. Site-specific Digital Soil Map Inputs in Simulating Maize Biomass and Yield versus the Soil Survey Geographic Database. (To be submitted to the American Society of Agronomy Journal)

- Miller, B.A., and **M.P. Bohn**. Spatial accounting of carbon stocks for quantifying carbon sequestration. (To be submitted to the Soil Science Society of America Journal)

PUBLICATION FIGURES

- Woida, K. 2021. Iowa's Remarkable Soils: The Story of Our Most Vital Resource and How We Can Save It. Bur Oak Books. University of Iowa Press. Iowa City, IA. pg. 43.   2021

- De, M., Riopel, J.A., Cihacek, L.J., Lawrinenko, M., Baldwin-Kordick, R., Hall, S.J., McDaniel, M.D., 2020. Soil health recovery after grassland reestablishment on cropland: The effects of time and topographic position. Soil Science Society of America Journal 84, 568–586. https://doi.org/10.1002/SAJ2.20007   2020

NON-REFEREED

- Coppage-Walker, D. and **M.P. Bohn**. 2022. Meyer Bohn, Iowa State University, Iowa Water Center 2020 Graduate Student. Iowa Water Center Annual Publication 2021: 36-41.   FEB 2022

- **Bohn, M.P**. and B.A. Miller. 2021. Precision Land Surface Analysis and Machine Learning for Enhanced Soil Maps. Getting into Soil and Water: 6-7. Iowa State University Soil and Water Conservation Club.   NOV 2021

JOURNAL REVIEWS

- Geoderma   2018-2019

GRANTS & TRAINEESHIPS

SUCCESSFUL APPLICATIONS

- USDA-NRCS Soil Science Collaborative Research Proposal National Funding Opportunity Grant - $298,951   JUN 2022 - 2024

- o   Miller, B.A., **M.P. Bohn**, and L. Bentancor. Change Detection of Soil Carbon Stocks from Legacy Data.
- [Iowa Water Center](#) Graduate Competition Grant - $5,000   2020 - 2021
  - o   **M.P. Bohn**. Strengthening the Foundation of Agroecosystem Models for Water Research: Precision Land Surface Analysis and Machine Learning for Enhanced Soil Maps
- DataFEWSion Graduate Traineeship   2020 - 2022
  - o $34,000 & tuition and fees (1 year)
  - o   Research at the nexus of Food, Energy and Water System for data-driven decision modeling, social awareness, communication, and professional skills.

GRADUATE HONORS AND AWARDS

- Iowa State University Graduate Teaching Excellence Award   MAY 2022
- Iowa State University Graduate Dean Scholarship   2018-2022
  - o $36,000/yr stipend and tuition (3 years)
- Iowa State University Brown Graduate Fellowship   2020
  - o $10,000
- SSSA, ASA, CSA Future Leaders in Science Award   14 MAR 2017
- SSSA, ASA, CSA Graduate Student Leadership Conference Award   6 NOV 2017
- Michael D. Sweeney Memorial Scholarship   2017
- NASA ND Space Grant Consortium Master's Fellowship   2016
- ND EPSCoR Graduate Research Fellowship   2016-2018

CONFERENCES AND PRESENTATIONS

- [2023 NCSS National Conference. Bismarck, ND.](#)   9-13 JUL 2023
  - o   **Bohn, M.P.,** B.A. Miller and L. Bentancor. Legacy Data Rescue for Retrospective Soil Survey and Change Detection in Topsoil Organic Carbon Stocks of the Corn Belt, USA.
  - o   **Bohn, M.P.,** B. Alvarez Torres and D. Hopkins. Town Hall Discussion – Recruitment and retention
    - ▪   Discussed membership survey results and had discussions on innovative ways to make more inclusive soil science activities and curriculum to gain, support, and retain members from diverse backgrounds.
- Hopkins, D.G., and **M.P. Bohn**. 2022. Value added pedology, a micromorphologic rewrite of a Natrudoll (Solonetz) case   31 JULY – 5 AUG 2022

study in North Dakota, USA. 22nd World Congress of Soil Science. Glasgow, Scotland.

- **Bohn, M.P**. and B.A. Miller. 2022. [Precision Land Surface Analysis and Machine Learning for Enhanced Soil Maps](): Strengthening the Foundation for Agroecosystems Research. Ph.D. Dissertation Defense Open Seminar. Agronomy Hall 2050. Iowa State University, Ames, IA.   14 JUL 2022

- **Bohn, M.P**., B.A. Miller and F. Miguez. [Impact of Soil Input Data on Maize Biomass and Yield Simulations](). DataFEWSion Symposium. Iowa State University, Ames, IA.   18 JAN 2022

- **Bohn, M.P**., B.A. Miller and F. Miguez. 2021. Impact of Soil Input Data on Maize Biomass and Yield Simulations. Natural Resource Conservation Service Digital Soil Mapping Practitioners Virtual Meeting.   7 DEC 2021

- **Bohn, M.P**. and B.A. Miller. 2021. [Enhanced Soil Maps to Support Agroecosystem modeling](). DataFEWSion Symposium. 20 Jan 2021. Iowa State University, Ames, IA.   20 JAN 2021

- **Bohn, M.P**. and B.A. Miller. 2021. [Evaluating the Accuracy of Ensemble Machine Learning and Statistical Uncertainty](): Spatial Prediction of Topsoil Thickness in Iowa. Iowa Water Center Conference Poster Presentations. 6-8 Apr 2021.   6-8 APR 2021

- **Bohn, M.P**. J. McDanel, and B.A. Miller. 2019. [Digital Hillslope Position as an Alternative Method for Soil Mapping](): A Case Study for Soil Surface Properties and Topsoil Thickness in Iowa. Poster #17. National Cooperative Soil Survey National Meeting, 2019. Narragansett, RI.   10-13 JUN 2019

- **Bohn, M.P**. Soil Health of the Barnes Soil Series in North Dakota: Survey Results. 2018. North Dakota State University Soil and Soil Water Training Presentations. Fargo, ND.   17 JAN 2018

- **Bohn, M.P**., D. Hopkins, C. Gasch, D. Steele, and S. Tuscherer. 2017. [Predicting Soil Health and Function from Remote-Sensed Evapotranspiration and Terrain Attributes in the Glaciated Plains of Eastern North Dakota](). ASA, CSSA, and SSSA International Annual meetings.Tampa, FL.   22 TO 25 OCT 2017

- National Cooperative Soil Survey National Conference, 2017. Boise, ID   25 TO 29 JUN 2017

- **Bohn, M.P**., D. Hopkins, D. Steele, and S. Tuscherer. 2017. [Evaluating Soil Health Using Remotely Sensed Evapotranspiration on the Benchmark Barnes Soils of North Dakota](). EGU General Assembly. Vienna, Austria.   23 TO 28 APR 2017

• SSSA, ASA, CSA [Graduate Student Leadership Conference](#). 2016. Phoenix, AZ.	5 TO 6 NOV 2016

GRADUATE COURSES RELEVANT TO DSM	DATE
• AGRON 525 (ISU) Crop and Soil Modeling	FALL 2021
• AGRON 665 (ISU) Digital Soil Mapping	SPRING 2020
• CRP 556 (ISU) GIS Programming and Automation	FALL 2018
• GEOL 568 (ISU) Applied Geostatistics for Geoscientists	FALL 2018
• GEOG 656 (NDSU) Advanced Programming in GIS	SPRING 2017
• GEOG 680 (NDSU) GIS Pattern Analysis and Modeling	FALL 2016