Agenda: On-Farm Precision Experimentation (OFPE) Workshop
December 13-15, 2022
Hilton Portland Downtown, Oregon
Hosted by the University of Connecticut, Montana State University, and the University of Illinois

Date	Time	Location	Topic	Host/Presenter
Dec. 13	5:00-5:30	Skyline II/I	Registration, Check-in	
	5:30-6:30	Skyline II/I	Introductions and Networking (Facilitated)	Carol McFarland, UConn
	6:30-7:00	Skyline II/I	Meet 'n' Greet, with Hors D'Oeuvres	
Dec. 14	7:45-8:45	Skyline II/I	**Working Breakfast**	
	8:00-8:10	Skyline II	Welcome	Haiying Tao, UConn
	8:10-9:00	Skyline II	Overview of OFPE	David Bullock, UI
	9:00-10:00	Skyline II	Current Work of Attendees	
			Arizona	Pedro Andrade-Sanchez
			Colorado	Amanda Amsberry
			Oregon	Judit Barroso
	10:00-10:20		**Break**	
	10:20-11:00		Guam	Adrian Ares
			Texas	Wenxuan Guo, TAMU
	11:00-12:00	Skyline II	*OFPE Trial Implementation: Opportunities and Challenges*	David Bullock; Bob Dunker.
	12:00-1:00	Skyline II/I	**Working Lunch**	
	12:10-12:50	Skyline II	*The Economic Performances of Different Trial Designs in OFPE: A Monte Carlo Evaluation*	Xiaofei Li, MSState
	12:50-1:00		**Break**	
	1:00-2:00	Skyline II	*DIFM's Cyber-Infrastructure*	David Bullock, UI
	2:00-3:30	Skyline I	Breakout Training Session (Group A): *Trial Design Software*	Brittani Edge, UI
	2:00-3:30	Skyline III	Breakout Training Session (Group B): *Data Processing Software*	David Bullock, UI
	3:30-3:45		**Break**	
	3:45-5:30	Skyline II	**Discussion:** *Potential Adoption: Facilitating OFPE Research in the West*	Carol McFarland
	5:30-6:00		**Break**	
	6:00-7:00	Atrium Ballroom	**Dinner**	
Dec. 15	7:45-8:45	Skyline II/I	**Working Breakfast**	
	8:30-9:00	Skyline II	Breakfast Presentation: *Economics of Precision Agriculture*	David Bullock, UI
	9:00-9:30	Skyline II	*Five Years of OFPE in Montana*	Bruce Maxwell, MSU
	9:30-9:50	Skyline II	*A Farmer's Prospective on Accelerating Understanding of Crop Performance*	Sasha Loewen, MSU
	9:50-10:10	Skyline II	*A Farmer's Experience in OFPE*	Chuck Merja, MT
	10:10-10:30	Skyline II	*A Farmer's Experience on OFPE*	Jesse Brunner, WA
	10:30-10:40		**Break**	
	10:40-12:00	Skyline III	Breakout Training Session (Group B): *Data Processing Software*	Brittani Edge, UI
	10:40-12:00	Skyline I	Breakout Training Session (Group A): *Trial Design Software*	David Bullock, UI
	12:00-1:00	Skyline II/I	**Working Lunch**	
	12:20-12:50		Lunch Presentation: *Data Analysis Methods for OFPE*	Paul Hegedus
	1:00-2:20	Skyline II	Training Session: *DIFM Database Structure and Use*	Keith Curran
	2:20-2:30		**Break**	
	2:30-4:00	Skyline II	Closing Discussion: *What Next?*	Carol McFarland, UConn

Agenda

Harvesting Insights with Data-Driven On-Farm Precision Experimentation (OFPE) online symposium

Time:

February 13, 2024 10-11:30AM PST/12-1:30PM CST

February 20, 2024 10-11:30AM PST/12-1:30PM CST

Location: Online Zoom (link)

Hosted by the University of Connecticut and University of Illinois Sponsored by Western SARE

Timetable

Date	Time	Location	Topic	Host
Prior to Feb. 13	Watch selected DIFM program video short-course (Link)			
Feb. 13	10-11:30AM PST/12-1:30PM CST	Online (https://wsu.zoom.us/j/93096318817)	OFPE overview Trial design software	Drs. Haiying Tao, David Bullock
Feb. 20	10-11:30AM PST/12-1:30PM CST	Online (https://wsu.zoom.us/j/93096318817)	Data cleaning, automated reporting software	Drs. Brittani Edge and David Bullock

Description: This data-driven on-farm precision experimentation (OFPE) online symposium funded by Western SARE will be organized and hosted by Dr. Haiying Tao and Dr. David Bullock affiliated with University of Connecticut and University of Illinois. Two complementary sessions focusing on the discussion regarding how to apply OFPE and Data-Intensive Farm Management (DIFM) successfully will be offered online via Zoom. The specific time, date, and Zoom link for this online symposium is outlined above. Participants with various backgrounds (i.e., growers, researchers, students, extension experts, consultants, agronomists, soil scientists, etc.) are expected to attend the symposium.

The first section (Feb. 13, 2024) will include (1) a brief introduction of OFPE methods, (2) Q & A for using trial design app to design a OFPE research trial, and (3) brainstorm on potential improvement for the trial design app to meet your need to design OFPE, potential usage of OFPE in your research and extension, potential obstacles to conduct OFPE.

The second section (Feb. 20) will include (1) why and how we need to clean the as-applied and yield data, (2) Q & A for using automated reporting app to create a report for a trial, and (3) brainstorm for better design of the report that we present to the farmers.

Please make sure that you practice the trial design app and reporting app before you join each section. The apps can be found here: https://difm.farm/. There are 5 farm-fields in the folder shared with you, including all the documents necessary for the practice.

Please try the apps using your own field and design a trial that fits your interests and document your feedback.

Please feel free to email Dr. Haiying Tao at haiying.tao@uconn.edu, Dr. Brittani Edge at bedge2@illinois.edu, Scott Wahl at scott@wahlhalla.com if you have any questions during your practice.

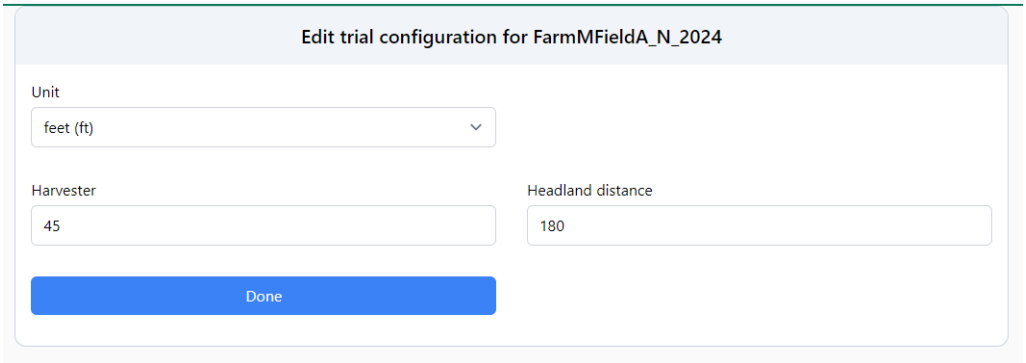
If you could email us a list of your questions and suggestions before and after each section, it would be greatly appreciated!

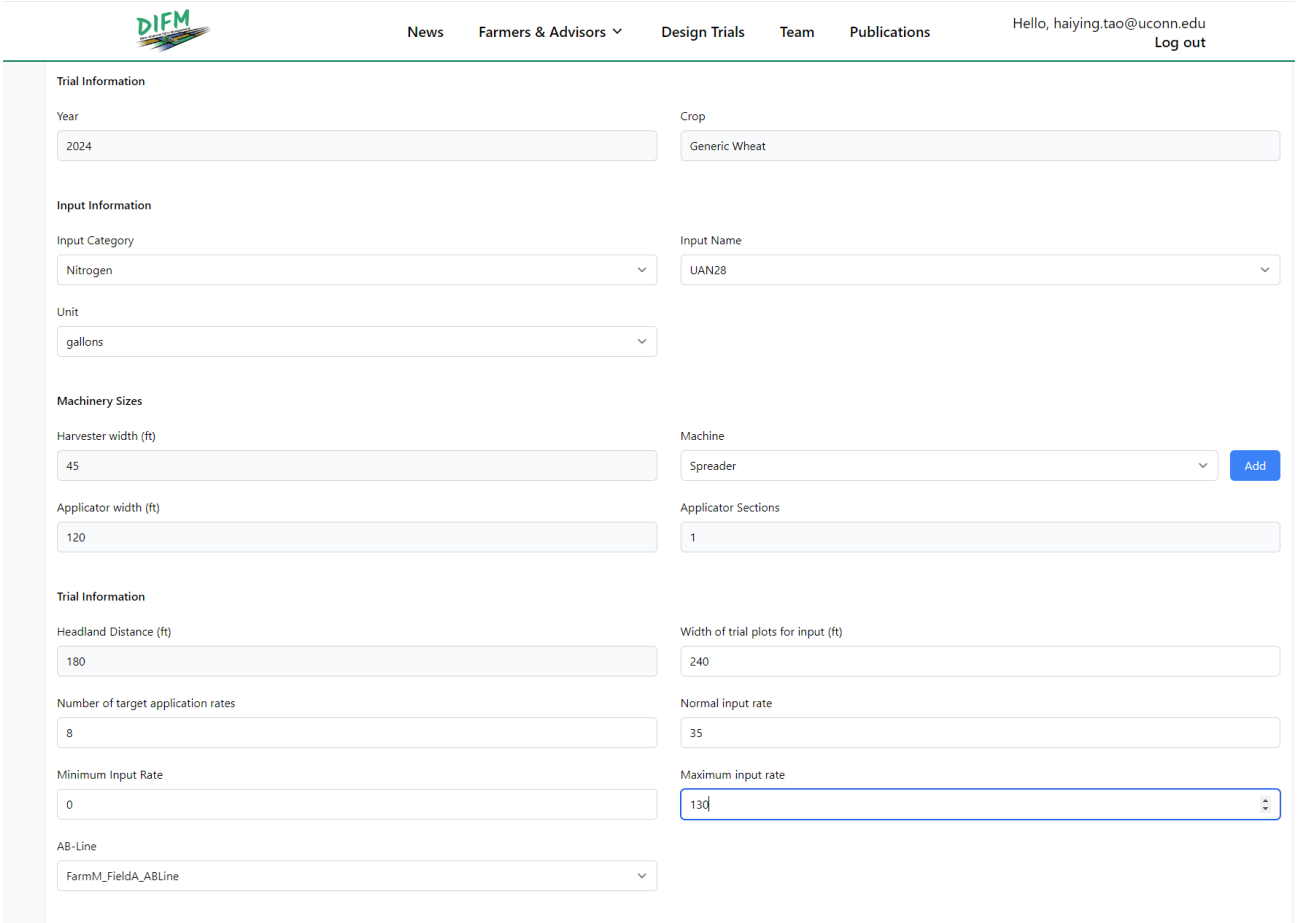
Looking forward to seeing you soon.

DIFM Trial Design Practice Guide

Register on website: https://difm.farm
Login after registration
Trial design steps

1. Input Farm and Field info:
   Farmers & Advisors – Farms – Add Farm – input address then click Find Location – add Farm Name - Save
2. Add farm equipment information: click **Manage**, add one equipment at a time, and make sure that you add all equipment that you will use for the OFPE.
3. Add field boundary polygon: click **Fields**, make sure to upload the field polygon in a zip file that contain all the required files for georeferencing your field, for example, .dbf, .prj., .shp, .shx, .qpj.
4. Create a trial:
   1) click **Trials** – Add trial, follow instruction.
   2) Click **Configure Trial**
      - Either Upload AB-line: Drag zip file containing the shape files
        Or Draw AB-line: Draw AB line using the tools on the left of the window
      - Complete the trial configurations in the rest of this page, use Farm M, Field A as an example:
      -





- Select one or two input (depending on how many factors you want to research on) specification by checking the selection box
- Click **Create**, it takes a few seconds, be patient
- **Open** the trial design, **download** it if you like, click **Report** to see the details of the trial design. If you like what you did, check the trial design, click **Final**. If you don't like it, create another trial design. And select the one that you like, click **Final**.

5. Add Data: **Farmers & Advisors – Farms – Fields – Data**, upload any other data you have one zip folder at a time and chose the right category for each data.

Five fields for practicing OFPE trial design

Trial Design Exercise 1
Farm M Field A
Montana Wheat & N Trial

Login to td.difm.farm, create farm by putting in Sun River, Montana.

1. In td.difm.farm, have them create Farm M near Sun River, Montana.
2. In td.difm.farm, have them upload FarmM_FieldA boundary.zip.
3. In td.difm.farm, have them upload FarmM_FieldA AB-line.zip.
4. Design a trial with these parameters:
   a. harvester width = 45 feet
   b. applicator width = 120 feet
   c. plot width = 240 feet
   d. headlands = 180 feet
   e. SQ rate (gallons? pounds?): 35 pounds
   f. target rates: 0, 12, 23, 35, 59, 82, 106, 130 pounds
   g. crop: winter wheat

5. Download trial design and ab-lines.

Trial Design Exercise 2
Farm M, create Field AWest
Montana Wheat & N Trial

1. Explain to them that the actual trial wasn't done on the whole area if the boundary file just used, but only about the west 2/3rds of it. Show them a picture of the as-applied data.

2. So draw in a new boundary and AB-line, consistent with what we see in the picture.

3. Design a trial with these parameters:
   a. harvester width = 45 feet
   b. applicator width = 120 feet
   c. plot width = 240 feet
   d. headlands = 180 feet
   e. SQ rate (gallons? pounds?): 35 pounds
   f. target rates: 0, 12, 23, 35, 59, 82, 106, 130 pounds
   g. crop: winter wheat

4. Download trial design and ab-lines.

Trial Design Exercise 3
Farm G Field C
Illinois Corn & UAN32 Trial

1. In td.difm.farm, have them create Farm G, near Kaneville, Illinois.
2. In td.difm.farm, have them upload boundary.
3. In td.difm.farm, have them draw ab-line along west border of field.

4. Design a trial with these parameters:
   a. harvester width = 40 feet
   b. applicator width = 80 feet
   c. plot width = 80 feet
   d. headlands = 160 feet
   e. crop: corn
   f. input: UAN32
   g. SQ rate 28 gal/ac
   h. 5 target rates: min = 7, max = 47

5. Download trial design and ab-lines.

Note: there is om data. Use it. Question is: How do they get the OM data (or ec data, etc.) into the non-experimental database?

Trial Design Exercise 4
Farm C Field Z (Zeaman 2021)
South Dakota Soybean Seed Rate Trial

Do Not USE This Case for Design Trial

Special about this trial:
Planter has many independently controlled sections. Harvester and planter have different headings, but planter painted in the trial well. But the harvester was 39.5 feet wide and the trial was designed assuming a 40 ft harvester, and it led to having to throw out quite a bit of data.

1. In td.difm.farm, have them create Farm C, Brule County, South Dakota.
2. In td.difm.farm, have them upload boundary.
3. In td.difm.farm, have them upload ab-line.

4. Design a trial with these parameters:
   a. harvester width = 40 feet
   b. applicator width = 60 feet
   c. plot width = 80 feet
   d. headlands = 147 feet
   e. Independently controlled sections: 12
   f. crop: soy
   g. input: seed
   h. SQ rate 44 pounds/ac
   i. 6 target rates: min = 30, max = 60

Note:
Seed rate units were pounds in this trial. Have Eric use pounds in the analysis. Conversion constant is that there are 2.7K seeds per pound of seed. So, the price of seed per pound equals the price of seed per thousand times 2.7.

Trial Design Exercise 5
Farm N Field 98
Ohio Corn, UAN28 & Seed Trial

1. In td.difm.farm, have them create Farm N, in Craword County, Ohio.
2. In td.difm.farm, have them upload boundary.
3. In td.difm.farm, have them upload ab-line.

4. Design a seed rate + uan28 trial with these parameters:
   a. Crop: corn
   b. Input 1: seed
   c. input 2: uan28
   d. harvester width = 30 feet
   e. Planter width = 60 feet
   f. UAN28 applicator width = 60 feet
   g. Planter independently controlled sections: 1
   h. uan28 independently controlled sections: 1
   i. plot width = 60 feet
   j. headlands = 130 feet
   k. SQ seed rate – 35500
   l. 8 target seed rates: min = 32000, max = 38000
   m. SQ uan28 rate 28 gal/ac
   n. 4 target uan28 rates: min = 19, max = 39

Trial Design Exercise 6
Farm W Field S
Ohio Corn Rate Trial

1. In td.difm.farm, have them create Farm W near Greenville, Ohio.
2. In td.difm.farm, have them upload boundary.
3. In td.difm.farm, have them make ab-line along west border of field.

4. Design a trial with these parameters:
   a. harvester width = 20 feet
   b. applicator width = 40 feet
   c. plot width = 40 feet
   d. headlands = 80 feet
   e. Independently controlled sections: 4
   f. crop: corn
   g. input: uan28ats
   h. SQ rate 48 gal/ac
   i. 5 target rates: min = 15, max = 86