



Eighth International Conference on
PRECISION AGRICULTURE
Conference Program

T H E M E S A N D A C T I V I T I E S

A to Z for Practitioners
Crop Quality
Education/Outreach
Engineering Technology
Environment
Exhibits
Geostatistics/Sampling
Industry Updates
Information Management
Modeling
Natural Resources Variability
New Applications Worldwide
Precision Management
Profitability
Remote Sensing

July 23-26, 2006

Marriott Hotel -- Minneapolis -- Minnesota -- USA

Eighth International Conference on PRECISION AGRICULTURE



PURPOSE

This will highlight significant research and its applications in precision agriculture and showcase emerging technologies and information management for agriculture. It will offer oral and poster presentations and exhibits, as well as a discussion and exchange of information in various aspects of precision agriculture. The Precision A to Z Tracks will offer extended sessions on key topics for producers and agribusiness.

ORGANIZED BY

The Precision Agriculture Center, College of Food, Agricultural and Natural Resource Sciences, University of Minnesota, CropLife Media Group, and Meister Media Worldwide

AFFILIATE ORGANIZATIONS

University of Minnesota:

- *College of Food, Agricultural and Natural Resource Sciences*
- *Agricultural Experiment Station*
- *Department of Soil, Water and Climate*
- *Extension Services*

COOPERATING ORGANIZATIONS

*Soil Science Society of America
American Society of Agronomy
NCERA - 180*

PUBLICITY

CCI MARKETING
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CONFERENCE SPONSOR





8th International Conference on Precision Agriculture

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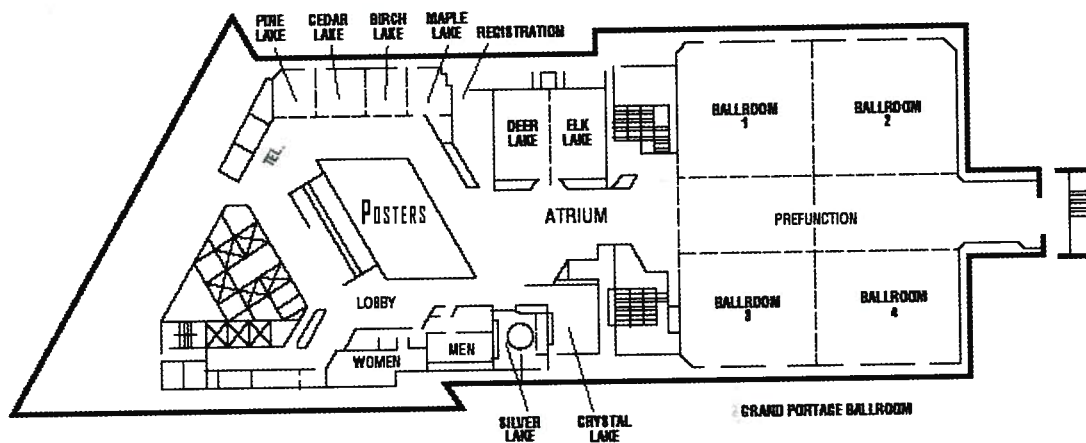
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Hotel Maps

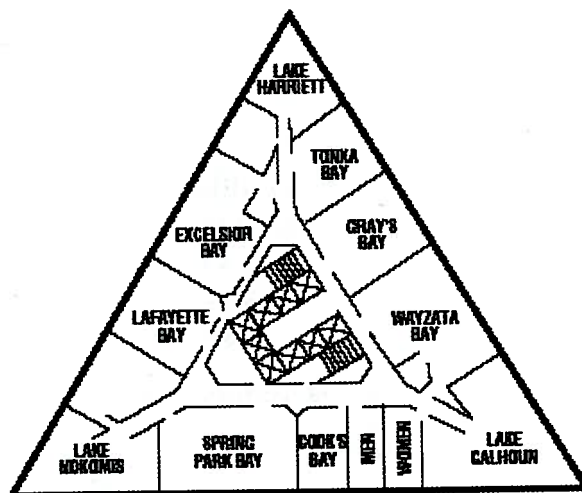
Marriott

MINNEAPOLIS CITY CENTER

FOURTH FLOOR



EIGHTH FLOOR



8th International Conference on Precision Agriculture

Program Overview



SUNDAY, JULY 23

Afternoon

- 11:00-6:00 **Registration**, 4th floor atrium
- 2:30-4:30 **Industry Updates**
- Wayzata Bay/Gray's Bay
 - Excelsior Bay/Lafayette Bay
- 2:30-4:30 **Concurrent Sessions**
- Remote Sensing, Deer Lake
 - Engineering Technology, Elk Lake
 - Precision Management, Pine Lake/Cedar Lake
 - Modeling, Birch Lake/Maple Lake
- 5:00-7:00 **Reception and cash bar**, Pre-Function Area
- 5:00-7:00 **Exhibit Opening**, Ballrooms 1/2



MONDAY, JULY 24

Morning

- 7:00-5:00 **Registration continues**
- 8:00-8:15 **Opening Remarks:** *David Mulla, Conference Chair*, Ballrooms 3/4
- 8:30-9:30 **General Session:**
Keynote Speaker: Tom Harmon UC Merced
Multiscale Embedded Network Sensors in Support of Integrated Precision Agriculture and Environmental Observations
Ballrooms 3/4
- 9:30-10:00 **Break** Pre-Function Area
- 10:00-12:00 **Concurrent Sessions**
- Natural Resources Variability, Birch Lake/ Maple Lake
 - Information Management, Crystal Lake
 - Precision Management, Pine Lake/Cedar Lake
 - Remote Sensing, Elk Lake
 - Engineering Technology, Deer Lake
- 10:00-12:00 **Practitioner A to Z Tracks**
- Weed Management, Gray's Bay/ Wayzata Bay
 - AutoSteer and Guidance, Excelsior Bay/ Lafayette Bay
- 10:00-6:00 **Exhibits**, Ballrooms 1/2
- 12:00-1:00 **Luncheon**, Ballrooms 3/4



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Program Overview

MONDAY, JULY 24

Afternoon

- 1:00-3:00 **Concurrent Sessions**
- Natural Resources Variability, Birch Lake/Maple Lake
 - Information Management, Birch Lake/ Maple Lake
 - Precision Management, Deer Lake
 - Remote Sensing, Elk Lake
 - Engineering Technology, Crystal Lake
 - Profitability, Pine Lake/ Cedar Lake
 - Crop Quality, Pine Lake/ Cedar Lake
- 1:00-3:00 **Practitioner A to Z Tracks**
- Management Zones/GIS Software, Gray's Bay/Wayzata Bay
- 3:00-3:30 **Break, Pre-Function Area**
- 3:30-5:00 **Poster Session, Lobby 4th floor**
Authors present 4-5 pm
- Information Management
 - Natural Resources Variability
 - Precision Management
 - Profitability
 - Remote Sensing
- 5:00-6:00 **Reception, Pre-Function Area**

*Note: The Presenter Ready Room is located in the Silver Lake room .
The Press Rooms are located in the Silver Lake and Cook's Bay rooms.*

TUESDAY, JULY 25

Morning

- 7:00-5:00 **Registration Continues**
- 8:00-6:00 **Exhibits, Ballrooms 1/2**
- 8:00-9:30 **Concurrent Sessions**
- New Applications Worldwide, Crystal Lake
 - Remote Sensing, Deer Lake
 - Profitability, Elk Lake
 - Precision Management, Birch Lake/Maple Lake
 - Spatial Statistics, Pine Lake/Cedar Lake
- 8:00-9:30 **Practitioner A to Z Tracks**
- Management Zones, Gray's Bay/Wayzata Bay
 - Remote Sensing, Excelsior Bay/Lafayette Bay
- 9:30-10:00 **Break, Pre-Function Area**
- 10:00-11:00 **Concurrent Sessions**
- New Applications Worldwide, Crystal Lake
 - Remote Sensing, Deer Lake
 - Profitability, Elk Lake
 - Precision Management, Birch Lake/Maple Lake
 - Modeling, Pine Lake/Cedar Lake

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Program Overview



TUESDAY, JULY 25

Morning (con't)

10:00-11:00 **Practitioner A to Z Tracks**

- Management Zones, Gray's Bay/Wayzata Bay
- On-Farm Research, Excelsior Bay/Lafayette Bay

11:00-12:00 **Poster Session**, Lobby 4th floor, Authors for AM posters present

- Crop Quality
- Education/Outreach
- Engineering Technology
- Environment
- Geostatistics
- New Applications Worldwide

12:00-1:30 **Luncheon**, Ballrooms 3/4

TUESDAY, JULY 25

Afternoon

1:30-2:30 **Concurrent Sessions**

- Geostatistics/Sampling, Pine Lake/Cedar Lake
- Remote Sensing, Deer Lake
- Profitability, Elk Lake
- Precision Management, Birch Lake/Maple Lake
- Modeling, Crystal Lake

1:30-2:30

Practitioner A to Z

- Sensors, Gray's Bay/ Wayzata Bay
- Value Added Information, Excelsior Bay/ Lafayette Bay

2:30-3:00

Break, Pre-Function Area

3:00-4:30

Concurrent Sessions

- Geostatistics/Sampling, Pine Lake/Cedar Lake
- Remote Sensing, Deer Lake
- Profitability, Elk Lake
- Precision Management, Birch Lake/Maple Lake
- Modeling, Crystal Lake

3:00-5:00

Practitioner A to Z Tracks

- Remote Sensing, Excelsior Bay/Lafayette Bay

4:30-5:30

Poster Session, Lobby 4th floor, Authors of PM posters present

- Modeling
- Precision Management
- Remote Sensing

5:30-6:00

Reception, Pre-Function Area This evening's reception is sponsored by:



6:30-9:00

Dinner Banquet, Ballrooms 3/4



8th International Conference on Precision Agriculture Program Overview

WEDNESDAY, JULY 26 Morning

7:30 **Registration Continues**

8:00-9:30 **Concurrent Sessions**

- Precision Management, Elk Lake
- Remote Sensing, Deer Lake
- Education/Outreach, Pine Lake/Cedar Lake
- Environment, Birch Lake/Maple Lake

9:30-10:00 **Break**, Pre-Function Area

10:00-10:30 **General Session**

Ballrooms 3/4:

Trends in Adoption of Precision Agriculture

- Jess Lowenberg-DeBoer

10:30-11:30 **Open Discussion:**

Visioning for the Future of Precision Agriculture in North America, South America, Africa, Australia, Asia and Europe
Ballrooms 3/4

- J. Lowenberg-DeBoer
- J. Molin
- P. Shaker
- J. Taylor
- S. Shibusawa

11:30-11:45 **Closing Remarks**

Ballrooms 3/4

- David Mulla, *Department of Soil, Water and Climate*
Precision Agriculture Center
University of Minnesota



Note: To leave messages for conference attendees, please use Poster Board 1 in the 4th floor lobby. The Exhibition Hall is open from Monday morning through Tuesday afternoon, and on Sunday from 5:00-7:00 pm.

8th International Conference on Precision Agriculture

Oral Presentations – Sunday PM



REMOTE SENSING

Deer Lake

Chair: Siva Balasundram

- 2:30 Prediction of Nutrients, Yield and Disease Severity in Cereals Using Chlorophyll Fluorescence, Spectral Reflectance and Neural Networks
*K. Klem**
- 3:00 Potential of the Tractor Mounted Hyperspectral System GVIS -2 for the Monitoring Of Winter Wheat – A Field Study in 2004
N. Oppelt, T. Hank and W. Mauser*
- 3:30 Identifying Soil Compaction in Cotton Using Vegetation Indices
S. Kulkarni and S. Bajwa*
- 4:00 Estimation of Corn Plant Population from Hyperspectral Remote Sensing Imagery Using Regression on Principle Components
K. Thorp, B. Steward, A. Kaleita and W. Batchelor*

5:00 - Reception (Pre-Function Area - 4th floor)

ENGINEERING TECHNOLOGY

Elk Lake

Chair: Jim Schepers

- 2:30 Precision Agriculture Applications of an On-the-Go Soil Reflectance Sensor
C. D. Christy, P. Drummond and E. Lund,*
- 3:00 Configurable Multi-Spectral Active Sensor for High-Speed Plant Canopy Assessment
K. H. Holland, J. S. Schepers and J. F. Shanahan*

5:00 - Reception (Pre-Function Area - 4th floor)

Note: The Presenter Ready Room is located in the Silver Lake Room . The Press Rooms are located in Silver Lake Room and Cook's Bay. Internet access for hotel patrons is located next to the hotel registration desk on the fourth floor.



8th International Conference on Precision Agriculture

Oral Presentations – Sunday PM

PRECISION MANAGEMENT

PINE LAKE / CEDAR LAKE

Chair: Greg Larson

- 2:30 Determining Optimum Management Zone-Based Seeding Rates Using On-Farm Experimentation and Variable Rate Seeding Technologies
J. Taylor, M. Mason, B. Whelan and A. McBratney*
- 3:00 A Cascaded Hough Transform for Crop Row Detection From Aerial and In-Field Agronomic Images
C. Gee and F. Truchee*
- 3:30 Spatially Variable Insecticide (SVI) Prescriptions Using Cotton Yield and Profit Maps
J. H. Temple, B. R. Leonard, R. D. Bagwell, K. Morris, R. Price, D. Magoun, K. Paxton, H. Niu, E. Barham*
- 4:00 GIS and GPS Procedures to Help Improve Cotton Management
E. Burris, E. Clawson, D. Burns, D. Cook, R. Hutchinson, J. Willers, G. Milliken, C. Overstreet and M. Wolcott*

5:00 - Reception (Pre-Function Area - 4th floor)

MODELING

BIRCH LAKE / MAPLE LAKE

Chair: Yuxin Miao

- 2:30 Simulation of Spatially Variable Precision Irrigation and Its Effects on Corn Growth Using CERES-Maize
K. DeJonge, A. Kaleita and K. Thorp*
- 3:00 Optimal Site-Specific Nutrient Management and the Law of the Minimum
C. Wang, R. Färe and C. F. Seavert*
- 3:30 Simulating the Effects of Agro-Management Practices on Water and Nitrogen Use Efficiencies of Rice/Wheat System in HaplustalFs Using RZWQM
S. Sahoo and S. Kar*

5:00 - Reception (Pre-Function Area - 4th floor)



8th International Conference on Precision Agriculture **Practitioner A-Z Track**

SUNDAY JULY 23RD Afternoon

Industry Updates Gray's Bay/ Wayzata Bay

- 2:30 AeroView
- 2:45 Ag Leader
- 3:00 Ag Renaissance
- 3:15 Auto Farm
- 3:30 Deere
- 3:45 Geosys
- 4:00 Holland Scientific

Industry Updates Excelsior Bay/ Lafayette Bay

- 2:30 Omnistar
- 2:45 Photon Systems
- 3:00 Redball
- 3:15 SST
- 3:30 Caledonia Solutions
- 3:45 Agri ImaGIS
- 4:00 Red Hen

MONDAY JULY 24TH Morning

Weed Management Gray's Bay/ Wayzata Bay Chair: Pam Rice

- 10:00 Remote Sensing for Weed Identification
S. Clay
- 10:30 Tools for "Mindful" Management Zones
L. Wiles
- 11:00 Automated Weed Spot Spraying with Active
Light Plant Detection Sensors,
T. Mayfield
- 11:30 Map, Manage, and Mine Scouting Data with
FieldRecon Software,
D. Krueger

12:00 - Luncheon (Ballroom 3/4)

The A to Z Tracks present the latest adTools vances in precision agriculture and include interactive sessions that showcase emerging technologies and information management strategies for production agriculture. Although intended for growers and the agribusiness community (i.e. practitioners), the A to Z Tracks are open to all participants at the Conference. Attendance earns continuing education units (CEUs).

8th International Conference on Precision Agriculture

Practitioner A-Z Track



Auto-Steer and Guidance

Excelsior Bay/ Lafayette Bay

Chair: Michael Cox

10:00 Adoption and Profitability of AutoSteer,
J. Lowenberg-DeBoer

10:30 Precise GPS Positioning - Recent
Developments, Future Possibilities,
J. Pointon

11:00 Advantages of Controlled Trafficking,
D. Daws

11:30 The Advantages of Multiple Frequency for
Precision Guidance,
G. Paynter

12:00 - Luncheon (Ballroom 3/4)

MONDAY JULY 24TH

Afternoon

Management Zones/GIS Systems

Gray's Bay/ Wayzata Bay

Chair: Greg Richards

1:00 Multi-Layer Nitrogen Management Zone
Delineation,
D. Franzen

1:30 Soils Information System: Current
Approches, Future Challenges
R. Wesch

2:00 SST Software: Current Approaches,
Future Challenges,
M. Waits

2:30 Solutions Using ISOBUS Machine
Management,
D. Swain

3:00 - Break (Pre-Function Area)

3:30 - Reception (4th Floor Lobby)

5:00 - Reception (Pre-Function Area)

TUESDAY JULY 25TH

Morning

Management Zones

Gray's Bay/ Wayzata Bay

Chair: Ann Lewandowski

8:00 Productivity Level Management Zones:
Nutrient Management and Profitability,
R. Khosla

8:30 Weed Management Zone Delineation
Methods,
S. Clay

9:00 Using Nutrient Management Zones to
Improve Water Quality,
J. Grove

9:30 - Break (Pre-Function Area)



8th International Conference on Precision Agriculture Poster Session – Monday PM

INFORMATION MANAGEMENT

- 2 Establishing the Relations Between Soybean Yield and Spatially-Variable Soil Attributes on a Clayey Oxisol
L. M. Schiebelbein, G. Roloff and D. Focht*
- 3 Pre Agro II – Linking Research on Technical Aspects of Precision Agriculture with Sustainability Issues of the Value Chain of Food Production
J. Schwarz, F. Dreger and A. Werne*

NATURAL RESOURCES VARIABILITY

- 4 Corn Nitrogen Response Models for Management Zones In Semiarid Environments
M. C. Gregoret, R. Bongiovani, J. Dardanelli and M. Diaz-Zorita,*
- 5 Association Between Rice Grain Quality, Grain Moisture and Soil Characteristics
C. Marchesi, R. Mutters, J. Thompson and R. Plant*
- 6 New Issues of Fertilization by Precision Agriculture in Wheat (*Triticum Aestivum* L.)
*P. Pepó**

PRECISION MANAGEMENT

- 7 Spatial Variability of Soil Properties Before and After Liming and Phosphorus Fertilizer Application at Variable Rates in Sugarcane
J. E. Cora and J.M.G. Beraldo*
- 8 Nitrogen Zone Delineation Methods
D. Franzen, A. Sims, J. Lamb, D. Long, F. Casey, J. Staricka, S. Panigrahi, V. Hofman, M. Halvorson, T. Nanna, R. Gautam and D. Ralston*
- 9 Airborne Imagery for Rapid Crop Productivity Assessments
G. Huluka, S. Norwood, J. Shaw, and P. Mask*
- 10 Effect of Within-Field Pedodiversity on the Efficiency of Management Zone Delineation with Soil Electrical Conductivity
M.L. Leclerc and M.C.Nolin*
- 11 Developing Site-Specific Management Zone Loss Factors and Economic Injury Levels for Economically Important Pests of Corn in Colorado
S. C. Merrill, F. B. Peairs and R. Kholsa*
- 12 Improving Irrigation Water Management: Use of High Resolution Soil Information in Multiple Crops
M. Stelford, R. Wesch, T. Panbecker and P.A. Rebeyrat*
- 13 Impact of Variable Rate Fertilization on Nitrate Leaching in a Citrus Orchard
Q. U. Zaman, A. W. Schumann and S. Shibusawa*



PROFITABILITY

- 14 Evaluating the Economic Impact of Field Area Measurements
*J.-M. A. Gandonou**, *C. R. Dillon*, *B. P. E. Koostra*, *T. Stombaugh* and *T. Mueller*
- 15 Profit Maximization under Risk Reducing Behavior Using Variable Cutting Timings for Kentucky Alfalfa
*J. Salim**, *C. R. Dillon* and *J.-M. Gandonou*
- 16 Community-Based Precision Agriculture with Branded-Produce for Small Farms
*S. Shibusawa**



REMOTE SENSING

- 17 Comparison of Active and Passive Optical Sensors for Assessment of Plant Nitrogen
*W. C. Bausch**
- 18 Spectral Reflectance of Cotton Leaves Under Water Stress
*O.A. El-Sebai**, *R. Sanderson*, *T.M. Sterling* and *M.P. Bleiweiss*
- 19 Use of Leaf-Based Sensor Technologies to Assess the Effects of Various Plant Diseases on Crop Growth and Development
*K. Groell**, *S. Graeff* and *W. Claupein*
- 20 Site-Specific Identification of Fungal Infection in Wheat Crop Using Remote Sensing
*J. Jacobi** and *W. Kühbauch*
- 21 Utility of Multispectral Imagery for Soybean (Glycine Max) and Weed Species Differentiation
*J. M. Prince**, *C. J. Gray* and *D. R. Shaw*



8th International Conference on Precision Agriculture

Exhibitor List

A & L Analytical Laboratories
2790 Whitten Rd
Memphis, TN 38133
Exhibit Booth 10

AeroView International
17001 Science Dr -
Ste 119
Bowie, MD 20715
Exhibit Booth 33

Ag Leader Technology
2202 S Riverside Dr
Ames, IA 50010 --
Exhibit Booths 7 & 8

Ag Renaissance Software LLC
PO Box 91235
Raleigh, NC 27675
Exhibit Booth 20

Agri Ima GIS Technologies
PO Box 159
Maddock, ND 58348
Exhibit Booth 32

AGCO Global Technologies
5850 Opus Parkway
Minnetonka, MN 55343
Exhibit Booths 18 & 19

Amity Technology, LLC
2800 7th Ave N
Fargo, ND 58102
Exhibit Booth 31

Auto Farm
1350 Willow Rd
Menlo Park, CA 94025
Exhibit Booth 28

Geometrics
2190 Fortune Dr
San Jose, CA 95131
Exhibit Booth 17

Geonics Limited
1745 Meyerside Drive
Mississauga, Ontario
L5T 1C6
Canada
Exhibit Booth 15

GEOSYS, Inc.
3030 Harbor Ln
Plymouth, MN 55447
Exhibit Booth 22

Holland Scientific
5011 South 73rd St
Lincoln, NE 68516
Exhibit Booth 13

John Deere Ag Management Solutions
4140 NW 114th St
Urbandale, IA 50322
Exhibit Booth 1

John Deere Agri Services
5500 Trillium Blvd Suite
EC101B
Hoffman Estates, IL
60192
Exhibit Booth 2

Mosaic
3033 Campus Dr
Plymouth, MN 55441
Exhibit Booth 29

NovAtel Inc.
120 68th Ave NE
Calgary AB T2E 8S5
Canada
Exhibit Booth 34

NTech Industries, Inc.
740 S State St
Ukiah, CA 95482
Exhibit Booth 24

Omnistar, Inc.
8200 Westglen
Houston, TX 77063
Exhibit Booth 35

Photon Systems Instruments Ltd
Kolackova 39
Brno 62100
Czech Republic
Exhibit Booth 21

Precision Ag
37733 Euclid Ave
Willoughby, OH 44094
Exhibit Booth 16

Raven Industries
205 E 6th St
Sioux Falls, SD 57104
Exhibit Booth 11

Rawson Control Systems, Inc.
116 2nd Street SE
Oelwein, IA 50662
Exhibit Booth 12

Red Hen Farming Systems, LLC
PO Box 2222
Fort Collins, CO 80522
Exhibit Booth 6

Redball, LLC
140 30th Ave SE
Benson, MN 56215
Exhibit Booth 23

SST Development Group
824 N Country Club Rd
Stillwater, OK 74075
Exhibit Booths 9 & 14

The Soil Company
Kadijk 7b
Groningen 9747 AT
The Netherlands
Exhibit Booth 5

Veris Technologies
601 N Broadway
Salina, KS 67401
Exhibit Booths 3 & 4

Zeltex Inc.
130 W. Maryland Pkwy
Hagerstown, MD 21740
Exhibit Booth 27

Note: The exhibitor booths are located in Ballrooms 1/2 on the 4th floor of the Marriott Hotel.

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.