



9th International Conference on

Precision Agriculture

JULY 20-23, 2008 • Hyatt Regency Tech Center
Denver Colorado USA

www.icpaonline.org

Conference Program

Conference Chairperson

Dr. Rajiv Khosla, Colorado State University
ICPA@Colostate.edu

Organizing Committee

Dr. Harold Reetz, International Plant Nutrition Institute/
Foundation for Agronomic Research
Dr. Dwayne Westfall, Colorado State University
Mr. Quentin Rund, PAQ Interactive

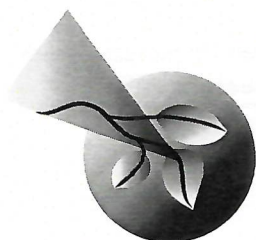
Conference Coordination

PAQ Interactive

Colorado
State
University

 **IPNI**
INTERNATIONAL
PLANT NUTRITION
INSTITUTE

 **FAR**
INTO THE FUTURE
FOUNDATION FOR AGRONOMIC RESEARCH



9th International Conference on

Precision Agriculture

JULY 20-23, 2008 • Hyatt Regency Tech Center
Denver Colorado USA

The 9th International Conference on Precision Agriculture 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 dedicated sessions on Precision A to Z tracks will offer information on key topics for practitioners, crop consultants, advisors, extension personnel, agronomists, producers and other practitioners.

The 9th ICPA is brought to you by Colorado State University, Foundation for Agronomic Research and International Plant Nutrition Institute.



Program Committee

Conference Chairperson:

Dr. Rajiv Khosla, Associate Professor & Extension Specialist of Precision Agriculture
Colorado State University, Fort Collins, CO, USA

Organizing Committee:

Dr. Harold Reetz, Director of External Support and Foundation for Agricultural Research
International Plant Nutrition Institute, Monticello, IL USA

Dr. Dwayne Westfall, Professor of Soil Fertility
Colorado State University, Fort Collins, CO, USA

Mr. Quentin Rund, PAQ Interactive

A to Z Track Chair:

Dr. Steve Phillips, Director, Southeast United States International Plant Nutrition Institute
Owens Cross Roads, AL, USA

Theme Session Chairs:

Biofuels

Dr. David Mulla, W.E. Larson Endowed Chair
Department of Soil, Water, and Climate
University of Minnesota, St. Paul, MN, USA

Robotics:

Dr. Simon Blackmore, Managing Director, Unibots
Visiting Professor of: University of Thessaly, Greece; Bristol Robotics Lab, UK;
China Agricultural University, Beijing, and Tokyo Univ of Agriculture and Technology, Japan

Traceability:

Dr. Richard Godwin, Cranfield University, UK

Precision Conservation:

Dr. Jorge Delgado, Soil Scientist
Soil Plant Nutrient Research Unit
USDA, Agricultural Research Service, Fort Collins, CO, USA

Education in Precision Ag:

Dr. Jared Williams, Professor of Crop and Soil Science
Brigham Young University-Idaho, ID, USA

Awards Committee Chair:

Dr. Newell Kitchen, Soil Scientist
USDA- Agricultural Research Service
Columbia, MO, USA

Award Committee Members:

Ms. Carolyn Hedley, Landcare Research, New Zealand

Mr. Edward Barnes, Cotton Inc., NC, USA

Dr. Timothy Stombaugh, University of Kentucky, KY, USA

Dr. Bruce Erickson, Purdue University, IN, USA

Dr. Kurt Thelen, Michigan State University, MI, USA

Dr. Scott Murrell, IPNI, IN, USA

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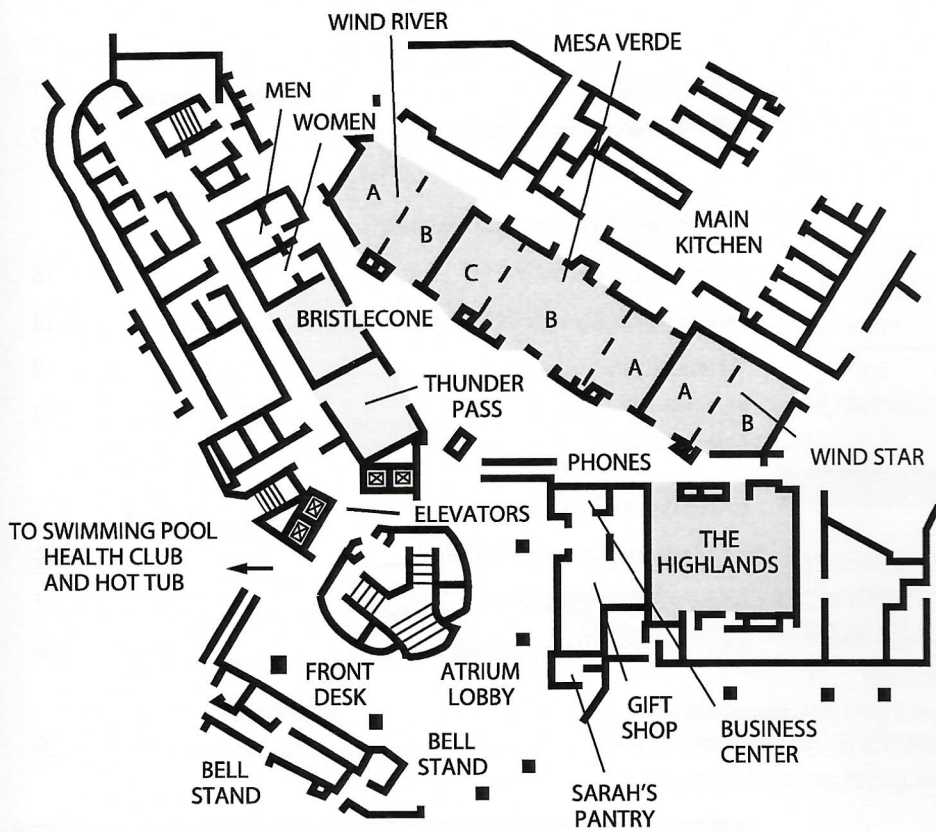
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Hotel Floor Plans

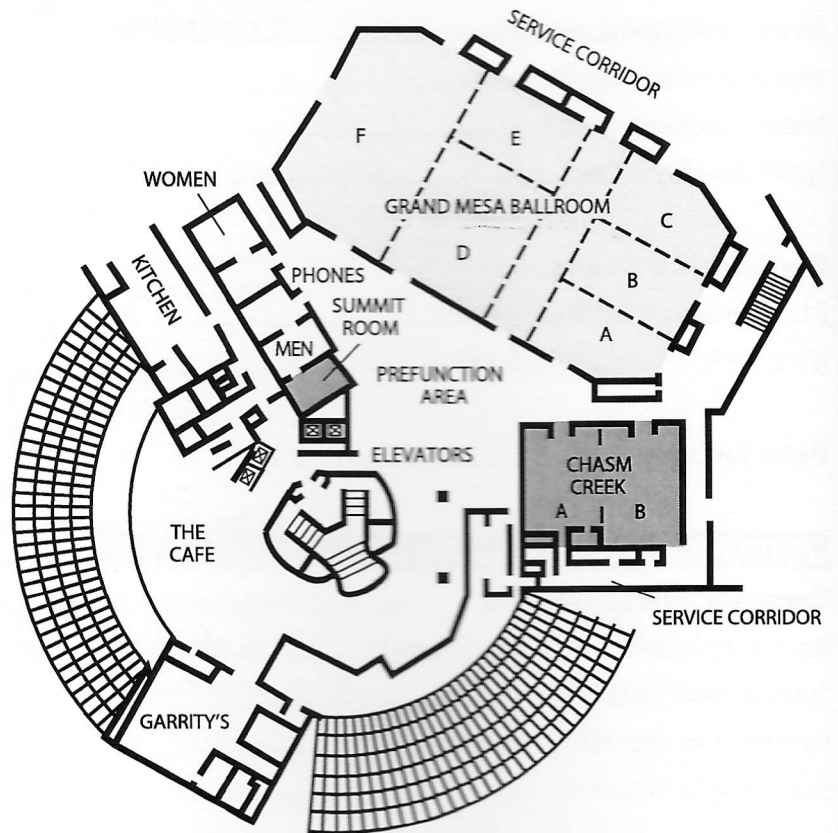
GROUND FLOOR



HYATT™

Hyatt Regency Tech Center
Denver, CO
USA

SECOND FLOOR



Exhibitor List

Adcon International Inc.
2050 Lyndell Terrace, Suite 120
Davis, CA 95616
(230) 753-1458

AgRenaissance Software LLC
PO Box 91235
Raleigh, NC 27675
(919) 518-8030

Agri ImaGIS Technologies
PO Box 159, 105 Central Ave., Suite 113
Maddock, ND 58348
(701) 438-2242

American Society of Agronomy
677 South Segoe Rd.
Madison, WI 53711
608-273-8080

ASD Inc.
2555 55th Street
Boulder, Co 80301
(303) 444-6522

AutoFarm
45700 Northport Loop East
Fremont, CA 94538
(510) 933-4911

Colorado State University
Department of Soil and Crop Sciences
C13 Plant Sciences Bldg
Ft. Collins, CO 80523
(970) 491-1920

CropLife Media Group
37733 Euclid Ave.
Willoughby, OH 44094
(440) 602-9142

ESRI
380 New York St.
Redlands, CA 92373
(909) 793-2853

Exactrix Global Systems
3310 E. Trent Ave.
Spokane, WA 99202
(620) 727-3995

FAR/IPNI
107 S. State St., Ste 300
Monticello, IL 61856
(217) 762-2074

Farm Works
PO Box 250
Hamilton, IN 46742
(260) 488-3388

Geonics Limited
1745 Meyerside Dr.
Mississauga, Ontario L5T 1C6 Canada
(905) 670-9580

Geosys Inc.
3030 Harbor Lane
Plymouth, MN 55447
(763) 557-0092

GeoVantage, Inc.
3 Centennial Drive
Suite 750
Peabody, MA 1960
(781) 856-4775

GK Technology, Inc.
204 5th Street East
Halsted, MN 56548
(218) 456-2486

Harrison Ag Technologies, Inc.
1008 W Grand Crossing
Mobridge, SD 57601
605.845.2433 Office

Holland Scientific Inc.
5011 South 73rd Street
Lincoln, NE 68516
(402) 488-1226

InfoAg
107 S. State St., Ste 300
Monticello, IL 61856
(217) 762-7955

Intellex Corporation
2465 Augustine Dr #102
Santa Clara, CA 95054
(408) 200-6500

John Deere Ag Management Solutions
4020 Aberdeen Dr.
Champaign, IL 61822
(515) 418-1993

John Deere Agri Services
246 W. 200 N
Black Foot, ID 83221
(208) 785-0038

Norac, Inc.
1290 Osborne Rd. NE
Fridley, MN 55432
(763) 786-3060

Ntech Industries, Inc.
740 S. State Street
Ukiah, CA 95482
(707) 467-3747

OmniSTAR, Inc.
8200 Westglen Dr.
Houston, TX 77063
(713) 785-5164

Outback Guidance by Hemisphere GPS
208 East "J"
Hastings, NE 68901
(402) 462-2555

Pessl Instruments
Werksweg 107
Weiz 8160, Austria
(+43) 1725521

Precision Technologies
PO Box 372
Bancroft, IA 50517
(515) 885-0330

Raven Industries
205 E. 6th St.
Sioux Falls, SD 57104
(800) 243-5435

Rawson Control Systems, Inc.
106 - 2nd St SE
Oelwein, IA 50662
(319) 283-2225

Skye
21, Ddole Enterprise Park
Llandrindod Wells
Powys LD1 6DF UK
+ 44 (0) 1597 824811

Spectrum Technologies
12360 S. Industrial Dr. E.
Plainfield, IL 60585
(815) 436-4440

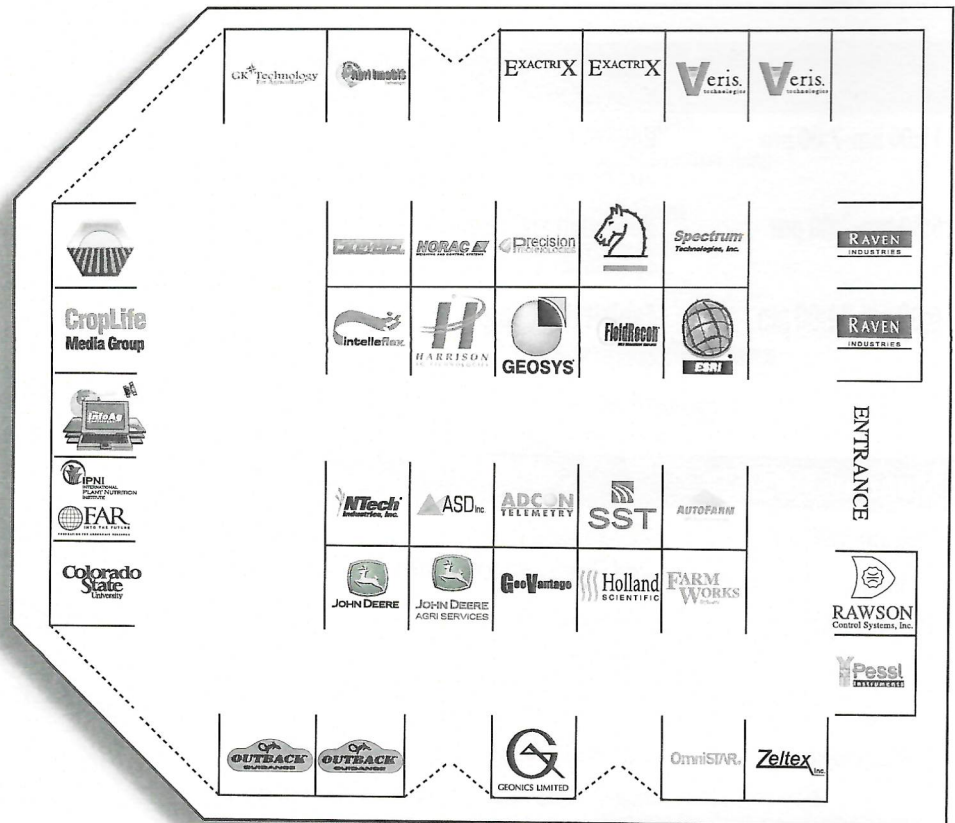
Springer
Van Godewijkstraat
Dordrecht, The Netherlands
(+31) 7865 76 245

SST Development Group
824 N. Country Club Rd.
Stillwater, OK 74075
(405) 377-5334

Stevens Water Monitoring Systems, Inc.
12067 NE Glenn Widing Dr, Suite 106
Portland, OR 97220
(503) 445-8000

Veris Technologies
601 N. Broadway
Salena, KS 67401
(785) 825-1978

Zeltex, Inc.
130 Western Maryland Parkway
Haterstown, MD 21740
(301) 791-7080



Program Overview

Sunday, July 20

11:00 am-7:00 pm	Registration 2nd Floor Prefunction Area
5:30 pm-7:00 pm	Reception and Cash Bar Centennial Room (12th floor)
6:00 pm-11:00 pm	Exhibit Hall Setup Grand Mesa DEF

Monday, July 21

7:00 am-5:00 pm	Registration Open 2nd Floor Prefunction Area
9:30 am-6:00 pm	Exhibit Hall Open Grand Mesa DEF
8:00 am-9:30 am	Opening Session Grand Mesa ABC
9:30 am-10:00 am	Break, Exhibit Hall Grand Mesa DEF
10:00 am-12:00 pm	Concurrent Sessions Remote Sensing and Nitrogen Management I Chasm Creek AB Biofuels and Precision Agriculture Mesa Verde ABC Economics of Precision Agriculture Technologies and Decision Tools Wind River AB Precision Horticulture Wind Star AB
10:00 am-12:00 pm	Practitioner A to Z Track A to Z: The Role of Precision Ag in BMPs The Highlands
12:00 pm-1:00 pm	Luncheon Grand Mesa ABC
1:00 pm-3:00 pm	Concurrent Sessions Remote Sensing I Chasm Creek AB

Monday, July 21, continued

	Vegetative Indices in Crop Production Mesa Verde ABC
	Modeling and Geostatistics Wind River AB
	Spatial Variability in Weeds Wind Star AB
1:00 pm-3:00 pm	Practitioner A to Z Track A to Z: Role of Precision Ag in BMPs II The Highlands
3:00 pm-3:30 pm	Break, Exhibit Hall Grand Mesa DEF
3:30 pm-5:30 pm	Poster Session – Authors Present 2nd Floor Atrium
5:00 pm-6:00 pm	Poster Session and Cash Bar 2nd Floor Atrium, Grand Mesa DEF

Tuesday, July 22

7:00 am-5:00 pm	Registration Open 2nd Floor Prefunction Area
8:00 am-6:00 pm	Exhibit Hall Open Grand Mesa DEF
8:00 am-10:00 am	Concurrent Sessions Remote Sensing and Nitrogen Management II Chasm Creek AB Spatial Variability in Soils I Mesa Verde ABC Guidance, Auto-steer and Robotics in Agriculture Wind River AB Engineering Technologies I Wind Star AB
8:00 am-10:00 am	Practitioner A to Z Track A to Z: GreenSeeker on the Farm, The Highlands
10:00 am-10:30 am	Break, Exhibit Hall Grand Mesa DEF

Tuesday, July 22, continued

10:30 am-11:30 am	Concurrent Sessions Precision Nitrogen Management <i>Chasm Creek AB</i> Precision Conservation <i>Mesa Verde ABC</i> Traceability I <i>Wind River AB</i> Information and Web-data Management <i>Wind Star AB</i>
10:30 am-11:30 am	Practitioner A to Z Track A to Z: Nutrient Management Software <i>The Highlands</i>
11:30 am-1:30 pm	Luncheon, Awards and Entertainment <i>Grand Mesa ABC</i>
1:30 pm-3:10 pm	Concurrent Sessions Modeling and GeoStatistics II <i>Chasm Creek AB</i> Spatial Variability in Soils II <i>Mesa Verde ABC</i> Traceability II <i>Wind River AB</i> Precision Management <i>Wind Star AB</i>
1:30 pm-3:10 pm	Practitioner A to Z Track A to Z: Selected Research Topics <i>The Highlands</i>
3:10 pm-3:30 pm	Break, Exhibit Hall <i>Grand Mesa DEF</i>
3:30 pm-5:30 pm	Poster Session – Authors Present <i>2nd Floor Atrium</i>
5:00 pm-6:00 pm	Poster Session and Cash Bar <i>2nd Floor Atrium, Grand Mesa DEF</i>

Wednesday, July 23

7:00 am-10:00 am	Registration Open <i>2nd Floor Prefunction Area</i>
8:00 am-10:30 am	Exhibit Hall Open <i>Grand Mesa DEF</i>
8:00 am-10:00 am	Concurrent Sessions Sensor Technology <i>Chasm Creek AB</i> Spatial Variability in Soils III <i>Mesa Verde ABC</i> Education and Training in Precision Agriculture I <i>Wind River AB</i> Spatial Variability in Crops <i>Wind Star AB</i>
8:00 am-10:00 am	Practitioner A to Z Track A to Z: Selected Industry Topics <i>The Highlands</i>
10:00 am-10:30 am	Break, Exhibit Hall <i>Grand Mesa DEF</i>
10:30 am-11:30 am	Concurrent Sessions Remote Sensing II <i>Chasm Creek AB</i> Precision Ag Adoption <i>Mesa Verde ABC</i> Education and Training in Precision Agriculture II <i>Wind River AB</i> Engineering Technologies II <i>Wind Star AB</i>
11:30 am-12:00 pm	Closing Remarks <i>Grand Mesa ABC</i>

Opening Plenary Session

Monday, July 21, 2008, 8:00 am

GRAND MESA ABC

Moderators: Dr. Harold F. Reetz, Jr. & Dr. Rajiv Khosla

Keynote Speakers

Dr. Joseph K. Berry

Joseph K. Berry is a leading consultant and educator in the application of Geographic Information Systems (GIS) technology. He is the principal of BASIS, consultants and software developers in GIS technology and the author of the "Beyond Mapping" column for GeoWorld magazine for over eighteen years. Since 1976, he has written more than two hundred papers on the theory and application of map analysis techniques, and is the author of the popular books *Beyond Mapping*, *Spatial Reasoning* and *Map Analysis*. He has been writing, teaching and consulting in Precision Ag for over fifteen years. Dr. Berry holds a B.S. degree in forestry from the University of California, Berkeley, a M.S. degree in business management and a Ph.D. emphasizing remote sensing and land use planning from Colorado State University.

Presentation Description

Now that precision agriculture is in its second decade, where are we? Yield mapping is gaining commonplace status for many crops and locales. Site-specific management of field fertilization has a growing number of users. Remote sensing applications are maturing. Irrigation control, field leveling, variable rate seeding, disease/pest modeling, stress maps and a myriad other computer mapping uses are edging over the horizon. However, it is important to keep in mind that site-specific farming isn't just a bunch of pretty maps, but a set of new technologies and procedures linking mapped variables to appropriate management actions. These revolutionary approaches are ushering in such radical changes as a shift in agriculture research from a historical emphasis on traditional experimental fields to "on-farm" research/studies; a possibility of "as applied" mapping for sensitive field inputs; a movement from traditional multivariate statistics to knowledge engines that assess patterns and relationships within and among map layers; and even a latent challenge of the 400 year-old Cartesian coordinate system for geographic referencing that utilizes hexagons and polyhedrals for detailed modeling of agricultural flows and cycles. This presentation investigates the legacy of Precision Ag's unique expression of Geotechnology, its current challenges and probable future directions.

Dr. Simon Blackmore

Simon Blackmore is a discipline leader in Precision Farming and agricultural robotics with a world-wide reputation. He has worked in Greece, Denmark, the UK and has spent 6 years working in Africa. Simon is the managing director of his own company called Unibots Ltd that is commercializing academic research in mobile outdoor robots. Simon holds visiting Chairs at the University of Thessaly in Greece, Bristol Robotics Lab in UK, China Agricultural University, Beijing and Tokyo University of Agriculture and Technology in Japan and regularly gives keynote presentations around the world on robotic agriculture. Currently he is the manager of the EU Farm of Tomorrow project called FutureFarm. (www.FutureFarm.eu)

Presentation Description

Simon's presentation will describe his vision of farming in the future based on currently developing techniques of Precision Agriculture, ICT and robotics that are projected forward in time. This vision includes a high level of data integration that not only meets on-farm management needs but also off-farm political and societal requirements in a more coherent management information system. Part of this vision includes the use of smarter machines that can behave sensibly by themselves in a commercial agricultural environment and show his first thoughts on a totally new mechanization system based on agricultural robots.

Oral Presentations

Monday, July 21, morning

Remote Sensing and Nitrogen Management I

CHASM CREEK AB

Moderator: John Shanahan
USDA-ARS

Biofuels and Precision Agriculture

MESA VERDE ABC

Theme Chair: David Mulla
University of Minnesota

- 10:00 **Developing Nitrogen Algorithms for Corn Production Using Optical Sensors**
R. W. Mullen, S. B. Phillips, W. R. Raun, and W. E. Thomason
- 10:20 **Variability in Observed and Sensor Based Estimated Optimum N Rates in Corn**
R.P. Sripada and J.P. Schmidt
- 10:40 **Using Corn Stalk Nitrate Testing and Remote Sensing to Evaluate Nitrogen Management Practices within Corn Fields**
T. M. Blackmer and P.M. Kyveryga
- 11:00 **Optimization of Active Canopy Sensor Spacing for Directing Mid-Season Nitrogen Application in Corn**
D.F. Roberts, V.I. Adamchuk, J.F. Shanahan, R.B. Ferguson, J.S. Schepers
- 11:20 **Assessing Intra- and Inter-Field Variability of Corn Nitrogen Fertilizer Need Using Ground-Based Reflectance Sensors**
N.R. Kitchen, K.A. Sudduth, S.T. Drummond, P.C. Scharf, H. Palm, and D.K. Shannon
- 11:40 **Nitrogen Management in Lowland Rice**
N. K. Fageria and A. B. Santos

- 10:00 **Spatial Variability of Energy Crop Quality Components**
K.D. Thelen, X. Hao, J. Gao, S. Kinder, and S. Smith
- 10:20 **Landscape Processes Impact on C Turnover and Energy Efficiency**
D.E. Clay, C.G. Carlson, and S.A. Clay
- 10:40 **Residue Removal Effects on Soil Properties within a Spatially Variable Field**
B.J. Wienhold and W.W. Wilhelm
- 11:00 **Soil Carbon and Nitrogen Mapping: How it Relates to New Markets and Public Policy**
E.D. Lund, G. Kweon, C. R. Maxton, P.E. Drummond
- 11:20 **Nitrogen Management Strategies for Corn Ethanol**
D. J. Mulla, R. M. Roggenbuck, P. C. Robert, and J. A. Hernández
- 11:40 **Spatial Variability of Corn Grain and Ethanol Responses to Nitrogen Fertilizer**
M.L. Ruffo, A. S. Henninger, M. Wiebers, F.E. Below

12:00 - 1:00 Luncheon
GRAND MESA ABC

Monday, July 21, morning

**Economics of Precision Agriculture
Technologies and Design Tools
WIND RIVER AB**

Moderator: Carl Dillon, University of Kentucky

- 10:00 **Variable Rate Decision Support Tool**
J. L. Havlin and R. W. Heiniger
- 10:20 **Economics of GPS-Enabled Navigation Technologies**
T.W. Griffin, D. M. Lambert, J. Lowenberg-DeBoer
- 10:40 **The Economics of Adopting PA Technologies on Australian Farms**
M. Sargent
- 11:00 **On-Farm Experimentation for Identification of Site-Specific Fertilization Potentials**
A. Meyer-Aurich, N. Muhammad, and R. Herbst
- 11:20 **Capital Investment in Precision Agriculture – A Real Options Analysis**
P. R. Tozer
- 11:40 **Cost Savings for Multiple Inputs with Swatch Control and Auto-Guidance**
J.M. Shockley, C.R. Dillon, and S. A. Shearer

**Precision Horticulture
WIND STAR AB**

*Moderator: Shrinivasa Upadhyaya
University of California-Davis*

- 10:00 **Citrus Greening Disease (*Huanglongbing*) Detection Using Aerial Hyperspectral Imaging**
W. S. Lee, R. Ehsani, and L. G. Albrigo
- 10:20 **Detection of Citrus Canker in Orange Plantation Using Fluorescence Spectroscopy**
E. C. Lins, J. Belasque Jr., and L. G. Marcassa
- 10:40 **A Software for Managing Remotely Sensed Imagery of Orchards Plantations for Precision Agriculture**
L. García-Torres, J. M. Peña-Barragán, D. Gómez-Candón, F. López-Granados, and M. Jurado-Expósito
- 11:00 **Hybrid Artificial Intelligence Approach for Grape Leaf Disease Diagnosis System from Color Imagery**
A. Meunkaewjinda, A. Srikaew, P. Kumsawat, and K. Attakitmongcol, and H. Boonjung
- 11:20 **Relationships Between Site-Specific Soil Hydrological Properties and Wine Production in Transformed Vineyard of Catalonia (NE Spain)**
I. Pla-Sentis, S. Nacci, and F. Fonseca
- 11:40 **Using Multispectral Imagery and Directed Sampling to Estimate Wine Grape Yield**
R.A. Ortega, L. A. Jara, A. A. Esser, and A. A. Inostroza

**12:00 - 1:00 Luncheon
GRAND MESA ABC**

Monday, July 21, afternoon

Remote Sensing and Nitrogen Management I

CHASM CREEK AB

*Moderator: Ronnie Heiniger
North Carolina State University*

Vegetative Indices in Crop Production

MESA VERDE ABC

*Moderator: Robert Mullen
The Ohio State University*

1:00 **Farm Management Support Through Remote Sensing**
J. Casanova, S. Farile, A. Romo, J. Sanz, and C. Moclán

1:20 **Remote Sensing-Based Biomass Maps for an Efficient Use of Fertilizers**
J.G.P.W. Clevers, K.H. Wijnholds, and J.N. Jukema

1:40 **Objective Biomass Assessment Using an Active Plant Sensor (Crop Circle™) – Preliminary Experiences on a Variety of Agricultural Landscapes**
T. Trotter, P. Frazier, M. Trotter, and D. Lamb

2:00 **Estimating Canopy Water Content Using Hyperspectral Remote Sensing Data**
J.G.P.W. Clevers, L. Kooistra, and M.E. Schaepman

2:20 **Profitability and Uptake of Nitrogen Application System Based on Remote Sensing on Commerical Farms in the UK**
S.J.Griffin

2:40 **Development of an Airborne Remote Sensing System for Aerial Applications**
Y. Lan, Y. Huang, D.E. Martin, W.C. Hoffman, B.K. Fritz, and J.D. Lopez

1:00 **Estimation of Sweet Corn Yield by Using Individual Wavelengths and Water Indices**
L. Genc, G. Camoglu, B. Asar, B. Yuksel, H. Turhan, S. Smith, and A.Y. Erbay

1:20 **Comparison of PVI and NDVI for Estimating Crop Ground Cover for Precision Agricultural Applications**
N. Rajan and S.J. Maas

1:40 **Identifying the Factors Affecting Cover Crop Performance in Row Crops**
J.D. Munoz, A. Kravchenko, S. Snapp, and R. Gehl

2:00 **Use of NDVI Measured with Active Optical Sensors on Sugarcane**
J.P. Molin, F. R. Frasson, F.P. Povh, and J.V. Salvi

2:20 **Seasonal Patterns of Vegetative Indices over Cropping Systems**
J.L. Hatfield and J.H. Prueger

2:40 **Prediction of Spring Barley Yield and Grain Quality Using Spectral Reflectance and Chlorophyll Fluorescence**
K. Klem

3:00 - 3:30 Break in Exhibit Hall

GRAND MESA DEF

Monday, July 21, afternoon

Modeling and Geostatistics I

WIND RIVER AB

*Moderator: Harold Van Es
Cornell University*

- 1:00 **Enhancement of On-the-Go Soil Sensor Data Using Guiding Sampling**
V.I. Adamchuk, R.A. Viscarra Rossel, D.B. Marx, and A.K. Samal
- 1:20 **Mapping Daily Soil Water Status for Precision Irrigation Scheduling**
C.B. Hedley and I.J. Yule
- 1:40 **Identifying Hot Spots in L'Anguille Watershed Using Modeling Approach**
D. Saraswat, P. Tacker, and N. Pai
- 2:00 **Investigations on the Spatial Variation of Soil Nutrients at Different Scales Using Geostatistics and Data Mining Techniques**
R. Herbst, M. Schneider, and P. Wagner
- 2:20 **Identification of Yield-Limiting Factors: Peanut on the Texas High Plains**
R. .Färe, C. Wang, A.M. Schubert, K. Bronson, and J. Johnson
- 2:40 **A Spatial and Spectral Modeling of Agronomic Images**
G. Jones, C. Gée, and F. Truchetet

Spatial Variability in Weeds

WIND STAR AB

*Moderator: Dale Shaner
USDA-ARS*

- 1:00 **A Weed Growth-Rate Model for an Autonomous Plant-Specific Weed Control Robot**
R.A. Pilgrim and A.J. Murdoch
- 1:20 **Generating Probability of Invasive Weed Occurrence Maps for Aid in Precision Conservation**
M. Bridges, P. Westra, S.A. Dewey, and K.A. Anderson
- 1:40 **Impact of Precision Applications of Ammonium Nonanoate on Weed Control Efficacy**
C.L. Webber III, M.J. Taylor, L.P. Brandenberger, J.W. Shrefler, L.K. Wells, and D.K. Shannon
- 2:00 **3D Object Recognition, Localization, and Treatment of *Rumex Obtusifolius* in Its Natural Environment**
M. Holpp, T. Anken, D. Seatovic, R. Grueninger, and R. Hueppi
- 2:20 **Development of Real-Time Color Analysis for the On-Line Automated Weeding Operations**
W. Ismail, and K. Rahman

3:00 - 3:30 Break in Exhibit Hall

GRAND MESA DEF

Tuesday, July 22, morning

Remote Sensing and Nitrogen Management II

CHASM CREEK AB

Moderator: Newell Kitchen

USDA-ARS

Spatial Variability in Soils I

MESA VERDE ABC

Moderator: Rodrigo Ortega,

Universidad Técnica Federico Santa María

8:00 Controller Performance Criteria for Sensor Based Variable Rate Application

R.K. Taylor, P. Bennur, J.B. Solie, N. Wang, P. Weckler, and W.R. Raun

8:00 Regional Usefulness of Nitrogen Management Zone Delineation Tools

D. Franzen, F. Casey, J. Staricka, D. Long, J. Lamb, A. Sims, M. Halvorson, V. Hofman

8:20 Procedures for Using Active Sensors to Direct In-Season N Application on Corn

J.F. Shanahan, D. Roberts, R.B. Ferguson, and J.S. Schepers

8:20 Zone Mapping Application for Precision-Farming: A Decision Support Tool for Variable Rate Application

X. Zhang, C. Helgason, G. Seielstad, and L. Shi

8:40 Correlation of Normalized Difference Vegetation Indices (NDVI) and Crop Variables with Corn Grain Yield

T.M. Shaver, R. Khosla, and D.G. Westfall

8:40 Delineating Management Zones Using Crop and Soil Variables with a Multivariate Geostatistic Approach

A. Castrignanò, B. Basso, M. Pisante, G. Buttafuoco, A. Troccoli, G. Cucci, and C. Fiorentino

9:00 Prediction of Nitrogen Needs with Nitrogen Rich Strips and Ramped Nitrogen Strips

D.C. Roberts, B.W. Brorsen, W.R. Raun, and J.B. Solie

9:00 Using a Fuzzy Approach and Web Services to Delineate Site Specific Yield Zones

J. Bobert, W. Mirschel, K.-O. Wenkel, R. Wieland, and E. Nash

9:20 Spatial Patterns of Nitrogen Response within Corn Production Fields

J.L. Hatfield

9:20 Precision Manure Management Strategies Across Site-Specific Management Zones for Enhancing Corn (*Zea Mays* L) Grain Yield

M.E. Moshia, R. Khosla, D.G. Westfall, J.G. Davis, and R. Riech

9:40 Evaluating GreenSeeker-based In-Season Nitrogen Management Strategy for Winter Wheat in North China Plain

F. Li, X. Chen, Y. Miao, L. Jia, and H. Zhang

9:40 Using Soil and Terrain Attributes to Delineate Management Zones in Corn Yield Response to Nitrogen Fertilization

P.M. Kyveryga, T.M. Blackmer, and P.C. Caragea

10:00 - 10:30 Break in Exhibit Hall

GRAND MESA DEF

Tuesday, July 22, morning

Guidance, Auto-Steer, and Robotics in Agriculture

WIND RIVER AB

*Theme Chair: Simon Blackmore
University of Thessaly*

- 8:00 **Forensic Methods for Aligned Farming Systems**
Clay Mitchell
- 8:20 **FutureFarm: The European Farm of Tomorrow**
Simon Blackmore
- 8:40 **A Specification for an Autonomous Crop Production Mechanization System**
B.S. Blackmore, S. Fountas, T.A. Gemtos, H. W. Griepentrog
- 9:00 **Seeding and Planting Plots for Crop Performance Evaluation Using GPS-RTK Auto Steering**
Robert N. Klein, Jeffrey A. Golus and Amanda S. Cox
- 9:20 **Field Robot Simulator**
Ali Zogheib

Engineering Technologies I

WIND STAR AB

*Moderator: Timothy Stombaugh
University of Kentucky*

- 8:00 **Design of Harvest Area Measurement System for Yield Map Correction**
L. Chen, W. Huang, Z. Meng, W. Fu, W. Ma, and R. Zhang
- 8:20 **Farm Networks in Pig Housing Systems**
D. Herd, A. Kuhlmann, B. Röbler, E. Gallmann, and T. Jungbluth
- 8:40 **A Modbus RTU, Multidrop Bus Design for Precision Irrigation**
F. J. Pierce and T. V. Elliott
- 9:00 **Evaluating New Spinner-Disc Control Technology for Variable-Rate Application of Poultry Litter**
C.M. Campbell, J.P. Fulton, T.P. McDonald, C.J. Brodbeck, C.W. Wood, and W.C. Zech
- 9:20 **A Tree Planting Site-Specific Fumigant Applicator for Orchard Crops**
S.K. Upadhyaya, V. Udompetaikul, M.S. Shafii, and G. T. Browne
- 9:40 **Technological Improvement on Sugar Cane Yield Monitor**
D.G.P. Cerri, G.R. Gray, and P.S.G. Magalhães

10:00 - 10:30 Break in Exhibit Hall

GRAND MESA DEF

Tuesday, July 22, mid-morning

Precision Nitrogen Management
CHASM CREEK AB

Moderator: Siva Balasundram
Universiti Putra Malaysia

Precision Conservation
MESA VERDE ABC

Theme Chair: Jorge Delgado
USDA-ARS

- 10:30 **Effect of Amending Urea Fertilizer with Sulfur and Sulfur-Oxidizing Bacteria Strains on Precision Management of Ammonia Volatilization Loss from Calcareous Sandy Soils**
A.A. Soaud, M.E. Saleh, K.A. El-Tarabily, and S. Matsumoto
- 10:50 **Nitrogen and Water Stress Effects on Hard Red Spring Wheat Crop Reflectance, Quality, and Yield**
C.L. Reese, D.E. Clay, D. Beck, C.G. Carlson, and S.A. Clay
- 11:10 **Sensor Based Variable Rate Nitrogen Application in Cotton**
A.Khalilian

- 10:30 **Using Terrain Attributes to Identify Areas Suitable for Grassed Waterways**
A.C. Pike, T.G. Mueller, S.A. Shearer, T.J. Nieman, and A.D. Karathanasis
- 10:50 **Identifying Critical Landscape Areas for Precision Conservation in the Minnesota River Basin**
J. Galzki, J. Nelson, and D. Mulla
- 11:10 **New Advance and Practices for Precision Conservation**
J.A. Delgado, J.K. Berry, and R. Khosla

11:30 - 1:30 Awards, Luncheon, and Entertainment
GRAND MESA ABC

Tuesday, July 22, mid-morning

Traceability I
WIND RIVER AB

Theme Chair: Dick Godwin
Cranfield University

- 10:30 **Tracing Grains to Field Positions: Overcoming the Obstacles**
J. A. Thomasson, R. Sui, T. J. Herrman, and K. M. Lee
- 10:50 **GPS Tracking for Monitoring Animal, Plant and Soil Interactions in Livestock Systems**
Mark Trotter and David Lamb
- 11:10 **Development of an Automatic Agrochemical Recording System for Crop Sprayers**
S. Peets, D. W. K. Blackburn, C. P. Gasparin, R. J. Godwin

Information and Web-data Management
WIND STAR AB

Moderator: Dharmendra Saraswat,
University of Arkansas Cooperative Extension Service

- 10:30 **User Requirements on ICT for Precision Crop Production**
J. Olsson and A. Rydberg
- 10:50 **Google Maps as an Aid for Land-Use Planning Decisions**
T.G. Mueller, N. Hamilton, A.C. Pike, B.D. Lee, A.D. Karathanasis, T.J. Nieman, J. E. Mueller, D. Carey, and D. Zourarakis

11:30 - 1:30 Awards, Luncheon, and Entertainment
GRAND MESA ABC

Tuesday, July 22, afternoon

Modeling and Geostatistics II

CHASM CREEK AB

Moderator: Viacheslav Adamchuk

University of Nebraska, Lincoln

- 1:30 **Evaluating Spatial Effects Induced by Alternative On-Farm Trial Experimental Designs with Cross-Regressive Variables using Monte Carlo Methods**
T.W. Griffin, R.J.G.M. Florax, and J. Lowenberg-DeBoer
- 1:50 **Use of a Cropping System Model for Soil-Specific Optimization of Limited Water**
L.R. Ahuja, S.A. Saseendran, L. Ma, D.C. Nielsen, T.J. Trout, A.A. Andales, and N.C. Hansen
- 2:10 **Simulating Spatial and Temporal Variability of Wheat Yield and Grain Protein in Southern Italy**
D. Cammarano, B. Basso, G. Cafiero, M. Pisante, A. Castrignanò, A. Troccoli, and G. Buttafuoco
- 2:30 **Adapt-N: Adaptive Nitrogen Management for Maize Using High-Resolution Climate Data and Model Simulations**
J.J. Melkonian, H.M. Van Es, A.T. DeGaetana, and L. Joseph
- 2:50 **Using Ceres Wheat for Predicting Site Specific Root Growth of Winter Wheat Under Contrasting Soil Moisture Conditions in East Germany**
A. Schulte-Eickholt, M. Langensiepen, R. Herbst, J. Bobert, W. Mirschel, K.O. Wenkel, M. Wehrhan, M. Sommer, and J. Kühn

Spatial Variability in Soils II

MESA VERDE ABC

Moderator: Robin Reich

Colorado State University

- 1:30 **Terrain Modeling to Improve Soil Survey in North Dakota**
D.W. Franzen and J. L. Boettinger
- 1:50 **The Benefits to Grid Sampling Depend Upon Mathematical Structure of Fertilizer Phosphorus and Potassium Recommendations**
J.H. Grove and E.M. Pena-Yewtukhiw
- 2:10 **Assessment of Automated Soil Mapping Systems for Macronutrients and Soil PH Using an Adapted Soil Sampling Design**
M. Schirrmann, H. Domsch, U.V. Wulffen, J. Nieter, and O. Zauer
- 2:30 **Soil Electrical Conductivity as a Management Tool in Precision Forestry**
H.L. Palm, H.E. Stelzer, K.A. Sudduth, N.R. Kitchen, and S.T. Drummond
- 2:50 **The Potential for Variable Rate Subsoiling on UK Farms**
S.J. Griffin

3:10 - 3:30 Break in Exhibit Hall

GRAND MESA DEF

Tuesday, July 22, afternoon

Traceability II
WIND RIVER AB

Theme Chair: Dick Godwin
Cranfield University

- 1:30 **Measuring Farmers' Preferences for Systems that Improve Agrochemical Traceability**
C.P. Gasparin, A. Angus, M. Cook, S. Peets, D.W.K. Blackburn and R.J. Godwin
- 1:50 **Recording Chemical Formulations Loaded into Crop Sprayers – The Implications for Traceability and Improved Sprayer Control**
P.C.H. Miller, A.J. Watts, R.J. Godwin
- 2:10 **On-board Module Builders, On-farm Research, and Precision Agriculture: Information Technology from Cotton Fields to Cotton Gins to Cotton Warehouses and Back Again**
T.W. Griffin and S.P. Slinksy
- 2:30 **Application of Radio Frequency Identification for Agricultural Traceability Systems**
D. W. K. Blackburn, S. Peets, C. P. Gasparin, R. J. Godwin
- 2:50 **Logistics – One Part of a Holistic Approach for Farm Management**
Walter Mayer

Precision Management
WIND STAR AB

Moderator: Kevin Bronson
Texas A & M University

- 1:30 **Precision Nitrogen Management Based on Nitrogen Removal in Rainfed Wheat**
D.J. Bonfil, I. Mufradi, S. Asido, and D.S. Long
- 1:50 **Mobile Mapping of Spatial Soil Properties and Turfgrass Stress: Applications and Protocols**
R.N. Carrow, J.Krum, I. Flitcroft, and V. Cline
- 2:10 **Optimization Model for Variable Rate Application in Extensive Crops in Chile**
R.A. Ortega, R.E. Muñoz, L.E. Acosta, and J.S. Riquelme
- 2:30 **Mapping Fertilizer Placement for Ground Spreading Equipment**
H. G. Lawrence and I.J. Yule
- 2:50 **Using Precise GPS/GIS Based Barley Yield Maps to Predict Site-Specific Phosphorus Requirements**
Akbar Sanaei

3:10 - 3:30 Break in Exhibit Hall
GRAND MESA DEF

Wednesday, July 23, morning

Sensor Technology

CHASM CREEK AB

Moderator: Won Suk Lee

University of Florida

Spatial Variability in Soils III

MESA VERDE ABC

Moderator: John Grove

University of Kentucky

8:00 **High Capacity System for Precision Agriculture
Reconnaissance and Intelligence**

E. Ram, M. Shechter, and E. Sela

8:20 **Individual Sensor Performance and Interpretational
Algorithms in a Sensor Array**

*E.M. Pena-Yewtukhiw, G. J. Schwab, J.H. Grove, L.W. Murdock, and
J.T. Johnson*

8:40 **Development of a Motorized Digital Cone Penetrometer**

S. Chung, I. Jung, Y. Hong, K. Jung, and K. Sudduth

9:00 **Multiple Sensing for Site-Specific Nitrogen Top Dressing:
Biomass, Chlorophyll, and Water**

H.J. Heege and E. Thiessen

9:20 **Continuous Analysis of Grain by Near Infrared
Transmission on Combines**

P. Berzaghi, L. Serva, and J.C. Ferlito

9:40 **On-Combine Near Infrared Spectroscopy Applied to
Prediction of Grain Test Weight**

D.J. Bonfil, I. Mufradi, S. Asido, and D.S. Long

8:00 **Summary of Forty Years of Grid Sampling Research**
D.W. Franzen

8:20 **Grid Soil Sampling Adoption and Abandonment in
Cotton Production**

*J.C. Walton, R.K. Roberts, J.A. Larson, D.M. Lambert, B.C. English,
S.L. Larkin, S.W. Martin, M.C. Marra, K.W. Paxton, and J.M. Reeves*

8:40 **Variable Rate Application of Fertilizers in Western
Canada**

A. Melnitchouck, G. Donald, and T. Schmaltz

9:00 **Modeling the Spatial Distribution of Soil pH in the State
of Jalisco, Mexico**

*R.M. Reich, N. Pongpattananurak, C. Aguirre-Bravo, R. Khosla, and
M. Kalkhan*

9:20 **Soil Moisture, Organic Matter and Potassium Influences
on EC_A Measurement**

C.J. Johannsen, R.R. Struthers, and D.K. Morris

9:40 **The Effect of Variable Rate Fertilizer During 8 Years of
Precision Farming Management in Arable Farm**

P. Gnip and K. Charvat

10:00 - 10:30 Break in Exhibit Hall

GRAND MESA DEF

Wednesday, July 23, morning

Education and Training in Precision Agriculture I

WIND RIVER AB

*Theme Chair: Jared Williams
Brigham Young University*

- 8:00 **Yield Monitoring Systems - Improving Their Use and Utilization Through Hands-on Training**
R.W. Heiniger
- 8:20 **Interdisciplinary Team Teaching of Precision Agriculture**
C.R. Dillon, T.G. Mueller, and S.A. Shearer
- 8:40 **A Case Study Approach for Teaching and Applying Precision Agriculture**
J.D. Williams
- 9:00 **Stimulating Interest In and Adoption Of Precision Agriculture Methods on Small Farm Operations**
C.W. Yohn, T.J. Basden, E.B. Rayburn, E.M. Pena-Yewtukhiw, and J.T. Fullen
- 9:20 **Map@Syst – Geospatial Solutions for Rural and Community Sustainability**
P. Rasmussen and J. Nowatzki
- 9:40 **Discussion**

Spatial Variability in Crops

WIND STAR AB

*Moderator: Yuxin Miao
China Agricultural University*

- 8:00 **Plant and N Impacts on Corn (*Zea mays*) Growth: What's Controlling Yield**
D.E. Clay, S.A. Clay, G. Reicks, and D. Horvath
- 8:20 **Principal Component Analysis of Rice Production Environment in Rice Terrace Region**
Y. Hirai, Y. Beppu, Y. Mori, K. Tomita, K. Hamagami, K. Mori, S. Uchida, and S. Inaba
- 8:40 **Using Yield History to Establish a Baseline for On-Farm Research**
C.B. Godsey, R.K. Taylor, and J.P. Schmidt
- 9:00 **Site-Specific Identification and Control of Root-knot Nematode in Cotton in Arkansas**
W.S. Monfort, A. Carroll, M. Emerson, T.L. Kirkpatrick, and T. Griffin
- 9:20 **Wheat Quality as Influenced Agronomic and Climatic Interactions**
J.M. Ness, D.E. Clay, C. Reese, K. Glover, R. Hall, C.G. Carlson, and S.A. Clay
- 9:40 **Precision Nutrient Management In Sugarcane**
V.C. Patil and B.T. Nadagouda

10:00 - 10:30 Break in Exhibit Hall
GRAND MESA DEF

Wednesday, July 23, mid-morning

Remote Sensing II

CHASM CREEK AB

*Moderator: Nithya Rajan
Texas Tech University*

Precision Ag Adoption

MESA VERDE ABC

*Moderator: Abdou Soaud
Cairo University*

10:30 Large Scale Crop Conditions Monitoring, From Countries to Township Scale

M. Kimmerly and L. Grignard

10:50 Using FORMOSAT-2 Satellite Imagery and Field Data to Monitor Growth and Predict Yield of Rice

C.-M. Yang, C.-C. Liu, and Y.-W Wang

11:10 FARMSTAR: An Operational Remote Sensing Service for Precision Agriculture

H. Douche, P. Roudier, P. Houdry, and A. Blondlot

10:30 A New Phase of Precision Agriculture in Japan

S. Shibusawa, H. Umeda, M.Kodaira, D. Yukio Sakuma, and Y. Kojima

10:50 Using High Resolution Remote Sensing Data for Precision Farming in Turkey

L. Genc, K. Demirel, G. Camoglu, I. Arici, H. Turhan, H. Genc, S.E. Smith, and S. Sariibrahimoglu

11:10 The Review of Studying and Using Advanced Technologies for Site Specific Management in Konya, Turkey

Dr. K. Perker, Dr. F.M. Botsali, Dr. A. Topal, and Dr. M. Zengin

11:30 - 12:00 Closing Remarks

GRAND MESA ABC

Moderators: Harold Reetz & Rajiv Khosla

Wednesday, July 23, mid-morning

Education and Training in Precision Agriculture II

WIND RIVER AB

*Theme Chair: Jared Williams
Brigham Young University*

**10:30 Teaching Critical Thinking Skills Using Geospatial
Technology as Instructional Tools**

T.A. Brase

**10:50 Precision Agriculture Technologies Teaching Experiences
at the University of Missouri – Face-to-Face and Online**

D.K. Shannon

Engineering Technologies II

WIND STAR AB

*Moderator: John Fulton
Auburn University*

**10:30 Development of a Model-Based Strategy for Overloading
Agricultural Crops**

G. Happich, H.H. Harms, and T. Lang

10:50 Implications of Standardized GNSS Accuracy Testing

*T.S. Stombaugh, M.P. Sama, R.S. Zandonadi, S.A. Shearer,
and B.K. Koostra*

11:10 Precision Farming Sensors for Sugar Cane

R.R. Price, R.M. Johnson, and J. Larson

11:30 - 12:00 Closing Remarks

GRAND MESA ABC

Moderators: Harold Reetz & Rajiv Khosla

A-Z Presentations

Monday, July 21

THE HIGHLANDS

A to Z: The Role of Precision Ag in BMPs

Moderator: Shannon Norwood, Alabama Cooperative Extension System

- 10:00 **A Global Framework for Fertilizer Management**
Tom Bruulsema
- 10:20 **Continuously Operating Reference Stations**
Shannon Norwood
- 10:40 **BMPs – Practical Farming Applications**
Larkin Martin
- 11:00 **Corn BMPs**
Robert Mullen
- 11:20 **GPS Technologies**
Sid Siefken
- 11:40 **Zone Management Helps Make Variable-Rate N for Wheat Practical**
David Franzen

A to Z: The Role of Precision Ag in BMPs II

Moderator: Will Henderson, Clemson University

- 1:00 **Managing Nematodes in Soybeans**
Scott Monfort
- 1:20 **Utilizing Imagery to Evaluate Management Decisions**
Kyle Freeman
- 1:40 **Precise Plant Population for Corn**
Ron Heiniger
- 2:00 **Zone Management for Highly Variable Soils**
Will Henderson
- 2:20 **The Role of Precision Ag Technologies in Grower Groups to Improve Soybean Management**
Tracy Blackmer
- 2:40 **Potato BMPs**
Bryan Hopkins

Tuesday, July 22

THE HIGHLANDS

A to Z: GreenSeeker on the Farm

Moderator: Brian Arnall

- 8:00 **Hands-On Demo of Greenseeker**
Brian Arnall
- 8:20 **Greenseeker Use in Wheat**
Wade Thomason

A to Z: Nutrient Management Software

Moderator: Harold Reetz, IPNI

- 10:30 **Demo of Farm Management Software**
Scott Murrell

A to Z: Selected Research Topics

Moderator: Chad Godsey, Oklahoma State University

- 1:30 **Potential for Harvesting Corn Stover for Ethanol Production in the Great Plains**
David Clay
- 1:50 **On-Farm Research Using Precision Ag Technologies**
Chad Godsey
- 2:10 **High Resolution Satellite Imagery for Precision Agriculture**
Chenghai Yang
- 2:30 **Remote Sensing Approaches for Identifying N Deficiencies in Corn**
David Mulla
- 2:50 **Questions Regarding the Potential, and the Limitations, to Use of NDVI Sensor Technology in Your Fields**
Eugenia Pena-Yewtukhiw

Wednesday, July 23

THE HIGHLANDS

A to Z: Selected Industry Topics

Moderator: Dale Shaner, USDA-ARS

- 8:00 **Survey of Fields in Colorado for Rapid Atrazine Degradation**
Dale Shaner
- 8:20 **Ion Exchange Resin For Accessing the Bioavailability of Plant Nutrients in Agricultural Soil Systems**
Luis Prochnow
- 8:40 **Labor and Product Quality Management for Fresh Produce**
Richard Johnson
- 9:00 **Rapideye: Imagery Service for Global Agriculture**
John Ahlrichs
- 9:20 **GPS Guidance: The Savior of Precision Ag?**
Robert Hill
- 9:40 **Precision Agriculture in China - An American Perspective**
Marc Vanacht
- 10:00 **Break in Exhibit Hall**

Poster Sessions–Monday

TOPIC	BOARD #	POSTER TITLE	AUTHOR
ENGINEERING TECHNOLOGIES	1	Soil Conductivity Electrical Measurement System Suited To An Agricultural Implement (Subsoiler)	L.M. Rabello, R.Y. Inamassu, A. Torre Neto, A. Luchiari Junior, J.P. Molin, And M.S. Simões
	3	Mapping Traffic Patterns For Soil Compaction Studies Using GIS	A.D. Meijer, C.R. Crozier, And R. W. Heiniger
	59	A New Approach For Systematic Seeding And Cultivating	A.Hakberdiev
MODELING & GEOSTATISTICS	5	Modeling Fertilizer Deposition From A Topdressing Aircraft	I.J. Yule And R.I. Murray
	7	Reconstructing Yield Maps From Incomplete Yield Monitor Data	Sidney Rosa Vieira And José Paulo Molin
	61	A New Approach For Quantitative Land Suitability Evaluation Using Geostatistics, Remote Sensing (RS) And Geographic Information System (GIS)	Majid Baghernejad And Mostafa Emadi
	63	An Artificial Neural Network To Understand Soil Compaction Effects On Cotton Yield	N. Pai, S.G. Bajwa, And S.S. Kulkarni
PRECISION HORTICULTURE	9	Interpolation Of Wine Grape Quality Indicators (Anthocyanin And Brix) And Development Of Differential Harvest Attachment	H. Singh, B. Sethuramasamyraja, S. Sachidhanantham, And R. Wample
	11	Temporal Analysis Of Vase Life Cut Roses Through Chemical Management In Uttarakhand (India)	Tanay Joshi And Santosh Kumar
	13	Delineating Management Zones For Precision Harvesting In A Vineyard Of North-Eastern Italy	F. Morari, C. Pagliarin, C. Giulivo, A. Castrignanò, And E. Tosi
	15	Identification Of Constraints To Banana Production In Three Eco-Regions Of Rwanda	Jules Kazungu
PRECISION MANAGEMENT/ PRECISION CONSERVATION	17	Site Specific Irrigation Of Peanuts On A Coastal Plain Field	P.J. Bauer, K.C. Stone, W.J. Busscher, J.A. Millen, D.E. Evans, And E.E. Strickland
	19	Precision Management Of Cattle Feedlot Waste	R.A. Eigenberg, B.L. Woodbury, And J.A. Nienaber
	21	Salt Stress Effects On Germination, Plant Growth, And The Accumulation Of Metabolites In Five Leguminous Plants	V.D. Taffouo, L. Meguekam, M. Kenne, And A. Magnitsop
	23	The Influence Of Component Crop Densities And Planting Patterns On Crop Growth And Soil Nutrient Content In A Dryland Maize/Cowpea Intercrop Under Contrasting Conditions	L.G. Owoeye, S.C. Moiri, And I.K. Mariga
	25	Variable Rate Irrigation Management For Peanut In The Eastern Coastal Plain	K.C. Stone, P.J. Bauer, W.J. Busscher, J.A. Millen, D.E. Evans, And E.E. Strickland
	27	Using The Illinois Soil Nitrogen Test To Determine Optimum Application Rates Of N In Corn	T. Smith
	29	Precision Management For Dairy Farming And Automation	I.J. Yule, H.G. Lawrence And J. Jago
	31	A GIS Database Schema For Small-Scale Precision Viticulture Using Geosensors	L.A. Hunter And C.A. Badurek

TOPIC	BOARD #	POSTER TITLE	AUTHOR
PRECISION MANAGEMENT/ PRECISION CONSERVATION	33	Nitrogen Mineralization Rate Of Animal Manure Across Productivity Level Management Zones	Moshia M.E., R. Khosla, D.G. Westfall, J.G. Davis, And R. Reich
	35	Effects Of Slash And Burn System On Soil Water Content At Baumata Forest In East Nusa Tenggara, Indonesia	M.R.S. Moata And A.U.K. Ngaji
	65	Allelopathic Effects Of Sunflower (<i>Helianthus Annuus</i>) On Germination And Growth Of Wild Barley (<i>Hordeum Spontaneium</i>)	Z.Y. Ashrafi, S. Sadeghi, And H.R. Mashhadi
	67	Effect Of Soil Solarization, A Non-chemical Method, On The Control Of Egyptian Broomrape (<i>Orobanch Aegyptiaca</i>) And Yield Improvement In Greenhouse Grown Cucumber	A.Y. Ashrafi, H.M. Alizadeh, And S. Sadeghi
	69	Agricultural Use Of Sewage Sludge And Its Influence On Soil Electrical Conductivity	H. Pashamokhtari And A. Hosseinpur
PROFITABILITY, ADOPTION, AND PERFORMANCE EVALUATION	37	An Appraisal Of The Impact Of Agro-Services Corporation On Food Crop Production: A Case Of Cocoa Farming Households Of Ogun State, Nigeria	K.A. Oluyole And J.O. Lawal
	39	Factors Influencing Adoption Of Research Results And Agricultural Technologies Among Cocoa Farming Households In Oyo State, Nigeria	J.O. Lawal
	41	Precision Agriculture In Arizona	P. Andrade-Sanchez
	71	Export Competitiveness Of Indian Horti-Business Industry: A Model For Capacity Building Under Precision Farming	B.K. Sikka, A. Singh, And A.K. Agnihotri
SPATIAL WEEDS MANAGEMENT	43	Precision Placement Of Corn Gluten Meal For Weed Control In Organic Vegetable Production	C.L. Webber III, M.J. Taylor, And J.W. Shrefler
	45	Weed And Disease Distribution Maps Extracted From Aerial Images Using Hough Transformation And Gabor Filtering	C. Gée And J. Heap
	47	Chlorophyll Fluorescence Imaging, PAR Transmission, And Canopy Reflectance Sensor Techniques For Assessment Of Competitive Ability Of Wheat Genotypes Against Weeds	K. Klem
	49	Multi-spectral Imaging System For Reflectance Measurement Application On Weed Detection	J.N. Paoli, C. Gée, And L. Assémat
	51	Use Of Goats For Vegetative Control On Military Landfills	K. Hoddinott
	53	Weed Infestation Maps In Different Systems Of Sugar Cane	F. Martins
	55	Comparative Researches Concerning The Assessment Of Methods Efficiency For Weeds Mapping In Setting Up Strategies For Weed Control At Winter Wheat	M. Gidea
	57	Evaluation Of Utilization Potential For Methods Of Georeferences In The Management Of Weed Contamination Of Potato Cultures	L. Musetescu And M. Gidea

Poster Sessions–Tuesday

TOPIC	BOARD #	POSTER TITLE	AUTHOR
REMOTE SENSING	2	Thermal Characterization And Spatial Analysis Of Water Stress In Cotton (<i>Gossypium Hirsutum L.</i>) And Phytochemical Composition Related To Water Stress In Soybean (<i>Glycine Max</i>)	S.J. Thomson, S.L. Defauw, P.J. English, J.E. Hanks, D.K. Fisher, P.N. Foster, And P.V. Zimba
	4	Utilizing Remote Sensing Images To Track Virus Spread In Wheat	A.R. Stilwell, G.L. Hein, And D.C. Rundquist
	6	Crop Water Stress Mapping For Site Specific Irrigation By Thermal Imagery And Artificial Reference Surfaces	M. Meron, J. Tsipris, V. Orlov, V. Alchnatis, And Y. Cohen
	8	Evaluation Spot 5 Multispectral Imagery For Crop Yield Estimation	C. Yang, J.H. Everitt, And J.M. Bradford
	10	Development Of An Unmanned Aerial Vehicle-Based Remote Sensing System For Site-Specific Management In Precision Agriculture	Y. Huang, Y. Lan, W.C. Hoffman, B.K. Fritz
	12	Stay On Target With SPAD In The Sky	U. Schulthess, D. Wesit, C. Jones, R. Lawrence, And N. Christensen
	14	Delineation Of Homogeneous Soil Zones Using Soil Electrical Conductivity, Multi-Polarization Sar And Hyperspectral Data	I. Perron, M.C. Nolin, E. Pattey, A. Smith, And J. Liu
	16	Remote Sensing Of Stressed Areas In Corn Fields To Prevent Aflatoxins	A.G. Carroll, S.W. Monfort, And M.J. Emerson
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