
70th Meeting

**WESTERN
SOCIETY
OF
WEED SCIENCE**

And

36th Meeting

**WESTERN AQUATIC
PLANT MANAGEMENT
SOCIETY**

March 13-16, 2017

**Coeur d'Alene Resort
Coeur d'Alene, ID**



Please bring this program with you.

**WESTERN SOCIETY OF WEED SCIENCE
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2016-2017**

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Welcome To Coeur d'Alene, ID!

Welcome to the joint meeting of the Western Society of Weed Science and the Western Aquatic Plant Management Society in Coeur d'Alene, ID. The Program Committee, Local Arrangements Committee, and the staff of the Coeur d'Alene Resort, have worked together to arrange an exceptional meeting. Enjoy the meeting, visit with friends and new acquaintances, and come away with renewed energy and new ideas. The Program and Local Arrangements Committees wish everyone a successful and productive meeting.

LOCAL ARRANGEMENTS COMMITTEE MEMBERS

**Scott Cook, Chair
Brian Schutte
Travis Bean**



WSWS/WAPMS 2017 PROGRAM AT A GLANCE

Tuesday, March 14				
Poster Session 7:45 – 9:15 am Authors of Odd Numbered Posters Present Bay 2-3				
General Session 9:45 – 11:45 am Bay 4-5				
Student Luncheon 12:00 – 1:00 pm Boardroom 5ABC				
Bay 2-3	Bay 1A 1B	Bay 6	Kidd Island/ N Cape	Casco Bay
Poster Room Open 7:30 am to 5:00 pm	Project 5 Biology & Ecology 1:30-5:00 Oral Papers	Aquatics 1:30-5:00 Oral Papers	Project 3 Agronomic Crops 1:30-4:45 Oral Papers	Project 2 Horticult. Crops 1:30-4:45 Oral Papers
Student Reception 5:00 – 6:30 pm Boardroom 5 ABC WAPMS Banquet-Dinner Cruise, 6:30 – 8:30 Dockside				
Wednesday, March 15				
Poster Session 7:45 - 9:15 am Authors of Even Numbered Posters Present Bay 2-3				
Bay 2-3	Bay 1A 1B	Bay 6	Kidd Island/ N Cape	Casco Bay
Poster Room Open 7:30 am to 5:00 pm	Project 1 Range & Natural Areas 9:45-11:30 Oral Papers	Aquatics 8:00-12:00 Oral Papers	Project 3 Agronomic Crops 9:45-11:30 Oral Papers	Project 5 Biology & Ecology 9:45-11:15 Discussion
WSWS Awards Luncheon 11:45 am - 1:30 pm Bay 4-5				
Bay 2-3	Bay 1A 1B	Bay 6	Kidd Island/ N Cape	Casco Bay
Poster Room Open 7:30 am to 5:00 pm Remove posters	Project 1 Range & Natural Areas 1:45-3:45 Oral Papers & 3:45-4:45 Discussion	Aquatics 1:30-5:00 Oral Papers	Project 3 Agronomic Crops 1:45-2:15 Oral Papers & 2:15-3:00 Discussion Ed & Reg Symposia: Macro-Photo. 3:15-4:45	Education & Regulatory Symposia: Risk Commun. 1:45-4:30
What's New in Industry 5:00 pm - 6:15 pm Bay 4-5				
Student Night Out 6:30 pm				
Thursday, March 16				
WSWS Business Meeting Breakfast and Student Awards 6:30 - 9:15 am Bay 4-5				
Bay 2	Bay 3	Bay 4-5		
Teaching & Technology Transfer 9:30-10:45 Oral Papers 10:45-11:30 Discussion	Project 3 Agronomic Crops 9:30-11:00 Oral Papers	Education & Regulatory Symposia: Climate Change 9:30-1:00		

**The Coeur d'Alene Resort
115 S. 2nd Street
Coeur d'Alene, Idaho 83814
(855) 999-7998**

Floor Plan

Need Floor Plan

WSWS/WAPMS SPECIAL EVENTS – MONDAY MARCH 13

8:00 am to 5:00 pm	WSWS Board of Directors Kidd Island Bay
2:30 pm to 5:00 pm	WERA-77 Managing Invasive Weeds in Wheat Group Meeting Bay 6
4:00 pm to 5:00 pm	WAPMS Board of Directors Boardroom 7 (7 th floor)
4:00 pm to 6:00 pm	Registration West CC Lobby
5:00 pm to 11:00 pm	Poster Display Set-Up Bay 2-3
5:00 pm to 11:00 pm	WSWS Sustaining Members Displays and WAPMS Vendors Bay 2-3
5:00 pm to 11:00 pm	Presentation Practice Room Boardroom 3 (7 th floor)
6:00 pm to 8:00 pm	WSWS and WAPMS Members Welcome and Retirees Reception Bay 4-5: Sponsored by Arysta Life Sciences, Monsanto, Alligare and Dow AgroSciences

WSWS/WAPMS SPECIAL EVENTS – TUESDAY MARCH 14

7:00 am to 4:00 pm	Registration West CC Lobby
7:00am to 11:00 pm	Presentation Practice Room Boardroom 3 (7 th floor)
7:30 am to 5:00 pm	Poster Displays Bay 2-3
7:30 am to 5:00 pm	WSWS Sustaining Members Displays and WAPMS Vendors Bay 2-3
7:45 am to 9:15 am	Poster Session – Authors of Odd Numbered Posters Present Bay 2-3
8:00 am to 9:30 am	Spouses Welcome Breakfast Dockside Cabin Sponsored by Syngenta Crop Protection
9:00 am to 9:30 am	WSWS New Member Orientation – Phil Banks, Business Manager Boardroom 3 (7 th Floor)
9:45 am to 11:45 am	General Session Bay 4-5
Noon to 1:00 pm	Student Luncheon Boardroom 5 ABC (7 th floor) Sponsored by Bayer CropScience
5:00 pm to 6:30 pm	Student Reception Boardroom 5 ABC (7 th floor) Sponsored by Syngenta

5:30 pm to 6:30 pm **Women of Aquatics Happy Hour**
Dockside

6:30 pm to 8:30 pm **WAPMS Banquet – Dinner**
Cruise Dockside

**WSWS/WAPMS SPECIAL EVENTS –
WEDNESDAY MARCH 15**

7:00 am to 4:00 pm **Registration**
West CC Lobby

7:00am to 11:00 pm **Presentation Practice Room**
Boardroom 3 (7th floor)

7:30 am to 5:00 pm **Poster Displays Remove Posters
Between 5 and 7 pm**
Bay 2-3

7:30 am to 5:00 pm **WSWS Sustaining Members
Displays and WAPMS Vendors
Remove Between 5 and 7 pm**
Bay 2-3

7:45 am to 9:15 am **Poster Session – Authors of Even
Numbered Posters Present**
Bay 2-3

9:00 am to 9:30 am **WSWS New Officer Orientation –
Phil Banks, WSWS-Business
Manager**
Boardroom 3 (7th Floor)

**All Members Invited to Learn About Duties and
Responsibilities**

11:15 am **WAPMS Business Meeting.**
Bay 6

11:45 to 1:30 pm **WSWS Awards Luncheon**
Bay 4-5

5:00 pm to 6:15 pm **What’s New in Industry**
Bay 4-5

5:00 pm to 6:00 pm **WAPMS Board of Directors**
Boardroom 7 (7th floor)

6:30 pm **Student Night Out**

**WSWS/WAPMS SPECIAL EVENTS –
THURSDAY MARCH 16**

6:30 am to 9:15 am **WSWS Business Breakfast**
Bay 4-5
Sponsored by BASF Corporation

8:00 am to 10:00 am **Registration**
West CC Lobby

9:30 am to 1:00 pm **Climate Change Symposium**
Bay 4-5

11:45 am to 1:00 pm **Board of Directors Wrap-Up
Meeting and Summer Meeting
Planning**
Kidd Island Bay

Out-Going and Incoming Officers and Committee Chairs

PROGRAM

Posters: Bay 2-3

7:45 – 9:15 am

**TUESDAY (Authors of odd numbers present) &
WEDNESDAY (Authors of even numbers present)
MARCH 14 & 15**

Undergraduate Posters

***PRESENTER † STUDENT POSTER CONTEST**

†Understanding the Effects of Herbicide Application on Hoary Alyssum (*Berteroa incana* L.) Seed Biology. Uriel D. Menalled*, Stacy Davis, Jane Mangold; Montana State University, Bozeman, MT (1)

†Exploring Novel Ways to Manage Downy Brome (*Bromus tectorum* L.) in Agronomic Systems in the Inland Pacific Northwest (PNW). Hannah C. Lindell*, Amber L. Hauvermale, Ian C. Burke; Washington State University, Pullman, WA (2)

†Characterizing Herbicide Resistant Kochia in Utah. Megan Nielsen*, Corey V. Ransom, Heather E. Olsen; Utah State University, Logan, UT (3)

†Pyroxasulfone Weed Management Systems in Oklahoma Winter Wheat. Grace K. Ogden*¹, Misha R. Manuchehri¹, Adam C. Hixson²; ¹Oklahoma State University, Stillwater, OK, ²BASF, Lubbock, TX (4)

Aquatics

Water temperature and *Eichhornia crassipes* stembase regrowth. John Miskella*, John Madsen; USDA-ARS, Davis, CA (5)

†Absorption Rates of 2,4-D Butoxyethyl Ester and 2,4-D Amine by Eurasian Watermilfoil. Kallie Kessler¹, Mirella Ortiz*¹, Scott Nissen¹, William Ratajczyk², Ryan Wersal²; ¹Colorado State University, Fort Collins, CO, ²Applied Biochemists - Lonza, Fort Collins, CO (6)

Efficacy of herbicides for managing *Egeria*: Mesocosm and field trials. John D. Madsen*¹, Kurt Getsinger², Guy B. Kyser³; ¹USDA ARS, Davis, CA, ²USAERDC, Vicksburg, MS, ³University of California, Davis, CA (7)

Weeds of Range and Natural Areas

*PRESENTER † STUDENT POSTER CONTEST

†Quantifying Shrub Canopy Interception of Two Imazapic Formulations and Impacts on Downy Brome Biomass.

Clay W. Wood*¹, Brian A. Meador²; ¹University of Wyoming, Laramie, WY, ²University of Wyoming, Sheridan, WY (8)

Large Scale Control of Invasive Weeds and Response of Native Species to Indaziflam or Indaziflam Tank Mixes.

James R. Sebastian*¹, Derek Sebastian², Harry Quicke³, Steve Sauer⁴; ¹Boulder County Open Space, Loveland, CO, ²Colorado State University, Fort Collins, CO, ³Bayer CropScience, Windsor, CO, ⁴Boulder County Open Space, Longmont, CO (9)

Implications of Drought and a Soil Amendment for Restoration of Cheatgrass-Infested Rangelands.

Dirk V. Baker*¹, Magda Garbowski², Cynthia S. Brown², Danielle Johnston³, Stuart P. Hardegree⁴, Meagan E. Schipanski²; ¹Campbell Scientific, Inc, Logan, UT, ²Colorado State University, Fort Collins, CO, ³Colorado Parks and Wildlife, Grand Junction, CO, ⁴USDA Agricultural Research Service, Boise, ID (10)

Developing and Evaluating a Rush Skeletonweed Dispersal and Habitat Suitability Model for Northern Utah.

Heather E. Olsen¹, Corey V. Ransom*¹, Larry W. Lass², Timothy Prather², Simon Wang¹; ¹Utah State University, Logan, UT, ²University of Idaho, Moscow, ID (11)

Comparing Residual Herbicides for Annual Grass

Control. Natalie Fronk*, Corey V. Ransom, Heather E. Olsen; Utah State University, Logan, UT (12)

Controlling Japanese Brome During Prairie Restoration in North Dakota.

Caleb Dalley*, Daniel Guimaraes Abe; NDSU, Hettinger, ND (13)

Weeds of Horticultural Crops

Herbicidal Properties of Mustard (*Sinapis alba*) Meal Compounds and Extract on Powell Amaranth and Green

Foxtail. Rick A. Boydston*¹, Matthew J. Morra², Ina Popova²; ¹USDA-ARS, Prosser, WA, ²University of Idaho, Moscow, ID (14)

Managing Red Potato Blemishes with 2,4-D. Andrew Robinson*, Eric Brandvik; North Dakota State University, Fargo, ND (15)

†Biology and Control of Broadleaf Dock.

Wiharti O. Purba*¹, Lisa W. DeVetter¹, Chris Benedict², Ian C. Burke³, Timothy W. Miller¹; ¹Washington State University, Mount Vernon, WA, ²WSU Whatcom Extension Center, Bellingham, WA, ³Washington State University, Pullman, WA (16)

Weeds of Agronomic Crops

*PRESENTER † STUDENT POSTER CONTEST

†**The Effect of White Chinese Geese on Weed Densities in Certified Organic Quinoa Production.** Kristofor C. Ludvigson*, Kevin M. Murphy; Washington State University, Pullman, WA (17)

Evaluating Weed Control Options for Sweet White Lupine (*Lupinus alba*) in Wyoming. Gustavo M. Sbatella*; University of Wyoming, Powell, WY (18)

Chickpea Tolerance and Broadleaf Weed Control with Pyridate. Rachel J. Zuger*, Ian C. Burke, Amber L. Hauvermale, Jeanette A. Rodriguez, Lindsay E. Koby, Henry C. Wetzel, Drew J. Lyon; Washington State University, Pullman, WA (19)

Application Timing Affects Soil-applied Herbicide Efficacy in Chickpea. Drew J. Lyon*¹, Henry C. Wetzel¹, Rick A. Boydston², Joan M. Campell³; ¹Washington State University, Pullman, WA, ²USDA-ARS, Prosser, WA, ³University of Idaho, Moscow, ID (20)

†**Performance of Fall and Spring Applied Field Pea Herbicides.** Travis R. Orrell*¹, Gail Stratman², Cody F. Creech³; ¹University of Nebraska, Sidney, NE, ²FMC, Stromsburg, NE, ³University of Nebraska, Scottsbluff, NE (21)

Winter Canola Tolerance to Clomazone and S-metolachlor. Misha R. Manuchehri*¹, Todd A. Baughman², Josh J. Lofton¹; ¹Oklahoma State University, Stillwater, OK, ²Oklahoma State University, Ardmore, OK (22)

Volunteer Persistence of Canola, Radish, and Turnip Under Different Tillage Regimes. Gabriel D. Flick*, Carol Mallory-Smith; Oregon State University, Corvallis, OR (23)

†**Different Genes Control Dicamba-Resistance in Kochia from Colorado and Kansas.** Junjun Ou*¹, Dean Pettinga², Philip Stahlman³, Philip Westra⁴, Todd A. Gaines², Mithila Jugulam¹; ¹Kansas State University, Manhattan, KS, ²Colorado State University, Fort Collins, CO, ³Kansas State University, Hays, KS, ⁴Colorado State University, Ft. Collins, CO (24)

†**Characterizing the Phenotypic Response to Fluroxypyr in *Kochia scoparia*.** Olivia E. Todd*¹, Dean Pettinga², Eric Westra², Phil Westra², Todd Gaines²; ¹Colorado State University, Fort Collins, CO, ²Colorado State University, Fort Collins, CO (25)

†**Integrating Crop Rotation and Herbicide Programs to Control Kochia Prior to Sugarbeet in Western Nebraska.** Clint W. Beiermann*¹, Nevin C. Lawrence²; ¹University of Nebraska-Lincoln, Lincoln, NE, ²University of Nebraska-Lincoln, Scottsbluff, NE (26)

†**Cross Resistance to Clopyralid and ALS Inhibitors in Mayweed Chamomile (*Anthemis cotula*).** Jeanette A. Rodriguez*, Rachel J. Zuger, Amber L. Hauvermale, Ian C. Burke; Washington State University, Pullman, WA (27)

Comprehensive Crop Tolerance and Weed Efficacy of Halauxifen-methyl + Florasulam in Winter Cereals throughout the Central and Eastern US. Daniel Chad Cummings*¹, Roger Gast²; ¹Dow AgroSciences LLC, Perry, OK, ²Dow AgroSciences, Indianapolis, IN (28)

Liquid Formulations of Thifensulfuron + Fluroxypyr and Thifensulfuron + Fluroxypyr + Metsulfuron with Various Tank Mixtures in Winter Wheat. Amanda L. Koppel*¹, William L. Hatler², Ken Carlson³, Joan M. Campell⁴, Edward S. Davis⁵, Donald L. Kambitsch⁶, Drew Lyon⁷, Henry C. Wetzel⁷; ¹DuPont Crop Protection, Richland, WA, ²DuPont Crop Protection, Boise, ID, ³DuPont Crop Protection, Johnston, IA, ⁴University of Idaho, Moscow, ID, ⁵Montana State University, Bozeman, MT, ⁶DuPont Crop Protection, Lewiston, ID, ⁷Washington State University, Pullman, WA (29)

Smooth Scouringrush Difficult to Control with Fallow-Applied Herbicides in a Winter Wheat/Spring Wheat/Fallow Rotation. Mark Thorne*¹, Derek Appel², Henry C. Wetzel¹, Drew Lyon¹; ¹Washington State University, Pullman, WA, ²Washington State University, Davenport, WA (30)

Evolution of Glyphosate-Resistant Horseweed and Russian thistle in Montana Cereal Production. Prashant Jha*, Vipin Kumar, Shane Leland, Anjani J, Charlemagne A. Lim; Montana State University, Huntley, MT (31)

Bicyclopyrone: Major League Weed Control in Minor League Crops. Stephen M. Schraer*¹, Dain E. Bruns², Cheryl L. Dunne¹, Gordon D. Vail¹, Monika Saini¹, Stott W. Howard¹; ¹Syngenta, Greensboro, NC, ²Syngenta, Greensboro, NC (32)

Broadleaf Weed Control in Winter Wheat with Bicyclopyrone Plus Bromoxynil. Traci Rauch*, Joan M. Campell; University of Idaho, Moscow, ID (33)

Mapping Weeds at Harvest by Optical Sensing of Green Plant Matter in Flowing Grain. Judit Barroso*¹, John D. McCallum², Dan S. Long²; ¹Oregon State University, Pendleton, OR, ²ARS-USDA, Pendleton, OR (34)

Cover Crop-Weed Dynamics in Two Contrasting Management Systems in the Northern Great Plains. Jose G. Franco*¹, Kenneth Beamer², Greta Gramig²; ¹USDA-ARS, Mandan, ND, ²North Dakota State University, Fargo, ND (35)

Cover Crop Safety Following Wheat Herbicide

Application. Mike H. Ostlie*¹, Kirk A. Howatt², Caleb Dalley³; ¹North Dakota State University, Carrington, ND, ²North Dakota State University, Fargo, ND, ³North Dakota State University, Hettinger, ND (36)

†Crop Response to Soil-Applied Herbicide Carryover.

Daniel M. Adamson*, Gustavo Sbatella, Andrew R. Kniss; University of Wyoming, Laramie, WY (37)

Mixtures of Glufosinate with 2,4-D or Dicamba for Cotton

Weed Management. William B. McCloskey*; University of Arizona, Tucson, AZ (38)

Chemical and Physiological Interactions Between the Herbicides Glyphosate and 2,4-D.

Marcelo R. de Figueiredo*¹, Agustin Zsögön², Valdemar L. Tornisielo³, Lazaro E. Peres³, Wilson da Silva⁴, Dauri A. Fadin⁵, Renata A. Sermarini³, Todd Gaines¹, Pedro Christoffoleti³; ¹Colorado State University, Fort Collins, CO, ²Universidade Federal de Viçosa, Viçosa, Brazil, ³University of Sao Paulo, Piracicaba, Brazil, ⁴EMBRAPA, Sao Carlos, Brazil, ⁵Dow AgroSciences, Mogi-Mirim, Brazil (39)

2,4-D and Dicamba Simulated Spray Tank-Contamination on Glyphosate- and Dicamba-Resistant Soybean.

Marcelo L. Moretti*¹, Bryan G. Young², Julie M. Young²; ¹Oregon State University, Corvallis, OR, ²Purdue University, West Lafayette, IN (40)

†Management of Multiple Resistant Italian Ryegrass - Characterizing Resistant Populations.

Lucas K. Bobadilla*, Andrew G. Hulting, Carol Mallory-Smith; Oregon State University, Corvallis, OR (41)

†Russian Thistle (*Salsola tragus* L.) and Lambsquarter (*Chenopodium album* L.) Control in Sweet Corn.

Tara Burke*, Rachel J. Zuger, Tim Waters, Ian C. Burke; Washington State University, Pullman, WA (42)

Teaching and Technology Transfer

***PRESENTER**

DuPont™ PrecisionPac™ Customized Herbicide Dispensing System.

Jeffrey T. Krumm*¹, Amanda L. Koppel², William L. Hatler³, Keith D. Johnson⁴, Ken Carlson⁵, Helen A. Flanigan⁶; ¹DuPont Crop Protection, Hastings, NE, ²DuPont Crop Protection, Richland, WA, ³DuPont Crop Protection, Boise, ID, ⁴DuPont Crop Protection, Grand Forks, ND, ⁵DuPont Crop Protection, Johnston, IA, ⁶DuPont Crop Protection, Greenwood, IN (43)

Basic Biology and Ecology

***PRESENTER † STUDENT POSTER CONTEST**

Wild Oat Seed Viability After Panicle Emergence. K. Neil Harker¹, Breanne D. Tidemann^{*1}, John T. ODonovan¹, Chris J. Willenborg², Steve J. Shirliffe², Eric N. Johnson², Elizabeth Sroka¹, Jennifer Zuidhof¹; ¹AAFC, Lacombe, AB, ²University of Saskatchewan, Saskatoon, SK (44)

†Kin Recognition in *Beta vulgaris* . Albert T. Adjesiwor^{*}, Andrew R. Kniss; University of Wyoming, Laramie, WY (45)

Experimental Methods for Confirming Resistance to Dicamba. Carl W. Coburn^{*1}, Andrew R. Kniss²; ¹University of Wyoming, Laramie, WY, ²University of Wyoming, Laramie, WY (46)

Survival, Growth, and Fecundity of Kochia Cohorts with Varying Densities Under Different Crop Canopies . Charlemagne A. Lim^{*}, Prashant Jha, Shane Leland, Anjani J; Montana State University, Huntley, MT (47)

†Growth and Development of Jointed Goatgrass (*Aegilops cylindrica*), Downy Brome (*Bromus tectorum*), and Winter Wheat (*Triticum aestivum*) in Response to Inter- and Intra-Specific Competition Under Greenhouse Conditions. Osama S. Saleh^{*}, Andrew R. Kniss; University of Wyoming, Laramie, WY (48)

†Effect of Crop Rotation Diversity on Long-Term Kochia (*Kochia scoparia*) Management. Elizabeth G. Mosqueda^{*1}, Andrew R. Kniss¹, Gustavo Sbatella¹, Prashant Jha², Nevin C. Lawrence³, David A. Claypool¹; ¹University of Wyoming, Laramie, WY, ²Montana State University, Huntley, MT, ³University of Nebraska-Lincoln, Scottsbluff, NE (49)

Unraveling Downy Brome (*Bromus tectorum* L.) Seed Dormancy in Agronomic Environments from the Inland Pacific Northwest (PNW). Amber L. Hauvermale^{*}, Hannah C. Lindell, Ian C. Burke; Washington State University, Pullman, WA (50)

TUESDAY MORNING MARCH 14

General Session

LOCATION: Bay 4-5
TIME: 9:45 AM - 11:45 AM
CHAIR &
MODERATOR: Monte Anderson
Bayer CropScience
Spangle, WA

***SPEAKER**

- 9:45 Meeting Announcements.** Monte D. Anderson*¹, Amy P. Ferriter²; ¹Bayer CropScience, Spangle, WA, ²Crop Production Services, Boise, ID (51)
- 10:00 Presidential Address.** Kirk A. Howatt*¹, Scott Nissen²; ¹North Dakota State University, Fargo, ND, ²Colorado State University, Fort Collins, CO (52)
- 10:30 Washington DC Report.** Lee Van Wychen*; National and Regional Weed Science Societies, Alexandria, VA (53)
- 10:50 Ice Age Geology: A Common Thread for Pacific Northwest Agriculture.** Nick Zentner*; Central Washington University, Ellensburg, WA (54)
- 11:10 Cannabis: *The Weed of the West!*** Alan Schreiber*; Paladin Agricultural Research, Eltopia, WA (55)

TUESDAY AFTERNOON MARCH 14

Basic Biology and Ecology

LOCATION: Bay 1A 1B
TIME: 1:30 PM - 5:00 PM
CHAIR & MODERATOR: Bradley Hanson
UC Davis
Davis, CA
CHAIR-ELECT: Nevin Lawrence
U of Nebraska
Scottsbluff, NE

***SPEAKER † STUDENT CONTEST**

- 1:30 A Draft Genome for *Kochia scoparia*.** Todd A. Gaines^{*1}, Eric L. Patterson¹, Dean Pettinga¹, Karl Ravet¹, Daniel Sloan¹, Patrick Tranel², Phil Westra¹, Christopher Saski³; ¹Colorado State University, Fort Collins, CO, ²University of Illinois at Urbana-Champaign, Champaign, IL, ³Clemson University, Clemson, SC (56)
- 1:45 †Use of SSR Markers to Track the Evolutionary Trajectory of Glyphosate Resistant *Kochia* in North America.** Adrian Quick^{*1}, Todd Gaines², Phil Westra²; ¹Colorado State University, Ft. Collins, CO, ²Colorado State University, Fort Collins, CO (57)
- 2:00 Diversity of Russian-thistle (*Salsola tragus* L.) in the Pacific Northwest.** John F. Spring^{*1}, Drew J. Lyon¹, Caleb C. Squires², Ian C. Burke¹; ¹Washington State University, Pullman, WA, ²Washington State University, Pullman, WA, WA (58)
- 2:15 †Effect of Crop Canopy on *Kochia (Kochia scoparia)* Seed Production.** Elizabeth G. Mosqueda^{*1}, Andrew R. Kniss¹, Gustavo Sbatella¹, Prashant Jha², Nevin C. Lawrence³, David A. Claypool¹; ¹University of Wyoming, Laramie, WY, ²Montana State University, Huntley, MT, ³University of Nebraska-Lincoln, Scottsbluff, NE (59)
- 2:30 The Basis of Glyphosate Resistance in "Rapid Necrosis" Giant Ragweed Populations.** Phil Westra^{*1}, Christopher VanHorn², Todd Gaines¹; ¹Colorado State University, Fort Collins, CO, ²Colorado State University, Ft. Collins, CO (60)
- 2:45 †Effects of Reflected Light Quality on Growth and Photosynthate Partitioning in *Beta vulgaris*.** Albert T. Adjesiwor^{*1}, Andrew R. Kniss²; ¹University of Wyoming, Laramie, WY, ²University of Wyoming, Laramie, WY (61)

- 3:00 Break**
- 3:15 Effect of Seed Treatments on Sugar Beet Germination under Far-Red Light.** David A. Claypool*, Andrew R. Kniss; University of Wyoming, Laramie, WY (62)
- 3:30 †Influence of Soil Type and Growing Environment on the Selectivity Index in Herbicide Resistance Studies.** Carl W. Coburn*, Andrew R. Kniss; University of Wyoming, Laramie, WY (63)
- 3:45 Seed Germination Requirements for Venice Mallow (*Hibiscus trionum*) Populations from Northwestern Wyoming.** Gustavo M. Sbatella*; University of Wyoming, Powell, WY (64)
- 4:00 †Integrated Weed Management of Winter Annual Grasses in Wheat using Harvest Weed Seed Control.** Neeta Soni*¹, Scott Nissen¹, Philip Westra², Michael Walsh³, Jason K. Norsworthy⁴, Todd Gaines¹; ¹Colorado State University, Fort Collins, CO, ²Colorado State University, Ft. Collins, CO, ³University of Sydney, Sydney, Austria, ⁴University of Arkansas, Fayetteville, AR (65)
- 4:15 Harvest Weed Seed Control in Western Canada: Identifying Target Species.** Breanne D. Tidemann*¹, Linda M. Hall², K. Neil Harker¹, Hugh J. Beckie³, Eric N. Johnson⁴, F. Craig Stevenson⁵; ¹AAFC, Lacombe, AB, ²University of Alberta, Edmonton, AB, ³AAFC, Saskatoon, SK, ⁴University of Saskatchewan, Saskatoon, SK, ⁵Private Consultant, Saskatoon, SK (66)
- 4:30 †Cytochrome P450 Metabolism of Fenoxaprop-p-ethyl in Wheat and Barley.** Caleb C. Squires*, Arron H. Carter, Ian C. Burke; Washington State University, Pullman, WA (67)
- 4:45 An Update on the Evaluation and Development of Physical Drift Reduction Adjuvants, Vapor Drift Reduction Adjuvants and Physical and Vapor Reduction Combination Adjuvants with Several Dicamba and 2,4-D Formulations.** Jim Daniel*¹, Philip Westra², Kirk A. Howatt³, Scott Parrish⁴, Trevor Jones⁵; ¹Ag Research Consultant, Hudson, CO, ²Colorado State University, Ft. Collins, CO, ³North Dakota State University, Fargo, ND, ⁴AgraSyst, Spokane, WA, ⁵AgGro Innovations, Cypress, TX (68)

TUESDAY AFTERNOON MARCH 14

Aquatics

LOCATION: Bay 6
TIME: 1:30 PM - 3:00 PM
MODERATOR: Scott Nissen
Colorado State University
Fort Collins, CO

***SPEAKER † STUDENT CONTEST**

- 1:30 Aquatic Plant Management Society (APMS) - an Update from the President.** John Madsen*; USDA-ARS, Davis, CA (69)
- 1:45 Aquatic Plant Management Regulatory Update - What is on the Horizon?** Carlton Layne*; AERF, Atlanta, GA (70)
- 2:00 Intentionally Applying Pesticides to Water? Tips on NPDES Permit Compliance.** Michael S. Blankinship*; Blankinship & Associates, Inc., Davis, CA (71)
- 2:15 Socioeconomic Impacts of Eurasian Watermilfoil in the Coeur d'Alene region.** Felix Liao*; University of Idaho, Moscow, ID (72)
- 2:30 An Update from the Coeur d'Alene Lake Milfoil Control Program.** Ben Scofield*; Coeur d'Alene Tribe, Plummer, ID (73)
- 2:45 Progress and Challenges in Aquatic Plant Management: A State-Wide Perspective.** Thomas Woolf*; Idaho State Department of Agriculture, Hayden, ID (74)

TUESDAY AFTERNOON MARCH 14

Weeds of Agronomic Crops

LOCATION: Kidd Island/N Cape
TIME: 1:30 PM - 4:45 PM
CHAIR & MODERATOR: Caleb Dalley
NDSU
Hettinger, ND

CHAIR-ELECT: Rand Merchant
BASF
CO

***SPEAKER † STUDENT CONTEST**

- 1:30 Investigation of Nozzle Erosion from Spray Mixtures using Commercial Application Equipment, Year One of a Multi-Year Approach.** Raymond L. Pigati*¹, Andrea C. Clark², Lillian C. Magidow³, Gregory K. Dahl⁴, Eric P. Spandl¹, Joe V. Gednalske²; ¹Winfield United, Shoreview, MN, ²Winfield United, River Falls, WI, ³Winfield, River Falls, WI, ⁴Winfield Solutions LLC, St. Paul, MN (75)
- 1:45 Application of PPO Inhibitors to Dormant Mint Grown in Western Oregon.** Kyle C. Roerig*, Andrew G. Hulting, Daniel W. Curtis, Carol Mallory-Smith; Oregon State University, Corvallis, OR (76)
- 2:00 Utility of the POST Soybean/Dry Bean Multi-Herbicide Sequential Application Program.** Rich Zollinger*; North Dakota State University, Fargo, ND (77)
- 2:15 Confirmation and Management of Glyphosate-Resistant Russian Thistle (*Salsola tragus* L.) from Montana and Washington.** Vipin Kumar*¹, Prashant Jha², John F. Spring³, Anjani J¹, Drew Lyon³, Ian C. Burke³; ¹Montana State University, Huntley, MT, ²Montana State University, Huntley, MT, ³Washington State University, Pullman, WA (78)
- 2:30 Preplant Burndown Herbicide Options for Kochia Control in Sugarbeet.** Andrew R. Kniss*, Gustavo Sbatella; University of Wyoming, Laramie, WY (79)
- 2:45 Impact of Management Systems and Predicted Climate Scenarios on Weed Communities.** Tim Seipel, Suzanne Ishaq, Fabian Menalled*; Montana State University, Bozeman, MT (80)

- 3:00 Break**
- 3:15 Introduction of StrikeLock; a Novel Adjuvant System.** Ryan J. Edwards*¹, Gregory K. Dahl², JoAnna A. Gillilan³, Raymond L. Pigati⁴, Andrea C. Clark⁵, Eric P. Spandl⁴, Joe V. Gednalske⁵; ¹Winfield United, River falls, WI, ²Winfield Solutions LLC, St. Paul, MN, ³Winfield United, Springfield, TN, ⁴Winfield United, Shoreview, MN, ⁵Winfield United, River Falls, WI (81)
- 3:30 †Viability Assessment of Mutagenesis-derived ACCase Resistant Wheat Lines as a New System for Control of Winter Annual Grasses.** Curtis M. Hildebrandt*, Scott Haley, Phil Westra, Todd Gaines; Colorado State University, Fort Collins, CO (82)
- 3:45 Commercial Launch of a New Herbicide Tolerant Wheat Production System.** Chad Shelton*; Albaugh, Anky, IA (83)
- 4:00 †Plant Back of Russet Burbank Seed Treated with Glyphosate and Dicamba.** Nelson Geary*, Harlene M. Hatterman-Valenti, Andrew Robinson; North Dakota State University, Fargo, ND (84)
- 4:15 Fall Preemergence Herbicide Applications to Spring Plantings of Cool Season Grass Seed Crops.** Daniel W. Curtis*, Kyle C. Roerig, Andrew G. Hulting, Carol Mallory-Smith; Oregon State University, Corvallis, OR (85)
- 4:30 †Cytochrome P450 Modulates 2,4-D Metabolic Resistance in Waterhemp(*Amaranthus tuberculatus*).** Marcelo R. de Figueiredo*¹, Darci A. Giacomini², Patrick Tranel³, Phil Westra¹, Franck Dayan¹, Scott Nissen¹, Todd Gaines¹; ¹Colorado State University, Fort Collins, CO, ²University of Illinois, Champaign, IL, ³University of Illinois at Urbana–Champaign, Champaign, IL (86)

TUESDAY AFTERNOON MARCH 14

Aquatics

LOCATION: Bay 6
TIME: 3:15 PM - 5:00 PM
MODERATOR: John Madsen
USDA-ARS
Davis, CA

***SPEAKER † STUDENT CONTEST**

- 3:15 Idaho's Cooperative Weed Management Areas and how county weed programs are key to reducing impacts of invasive weeds with local control and working groups.** Jeffrey Pettingill*; Bonneville County, Idaho Falls, ID (87)
- 3:30 Montana's Noxious Weed Program.** Dave Burch*; Montana Department of Agriculture, Helena, MT (88)
- 3:45 Lake Tahoe's Aquatics Program - An Update.** Dennis Zabaglo*; Tahoe Regional Planning Agency, Stateline, NV (89)
- 4:00 Taking Action Against Invasive Aquatics in BC.** Danielle Toperczer*; Invasive Species Council of BC, Richmond, BC (90)
- 4:15 From Zero to Sixty: Tracing the Evolution of Alberta's Aquatic Invasive Species Program.** Kate Wilson*; Government of Alberta, Edmonton, AB (91)
- 4:30 Mussels and Mutts: Alberta's Conservation K-9 Program.** Cynthia Sawchuk*; Government of Alberta, Canmore, AB (92)
- 4:45 Live Demo - Alberta's K-9 Detection Program.** Cynthia Sawchuk* and Hilo, Government of Alberta, Canmore, AB (93)

TUESDAY AFTERNOON MARCH 14

Weeds of Horticultural Crops

LOCATION: Casco Bay
TIME: 1:30 PM - 4:45 PM
CHAIR & MODERATOR: Pam Hutchinson
University of Idaho
Aberdeen, ID
CHAIR-ELECT: Andy Robinson
U of MN/NDSU
Fargo, ND

***SPEAKER † STUDENT CONTEST**

- 1:30 Halauxifen-methyl: A New, Innovative Herbicide for Control of Broadleaf Weeds in Turfgrass.** Vanelle F. Peterson*¹, Jamie M. Breuninger², Anita L. Alexander³, Daniel D. Loughner⁴; ¹Dow AgroSciences, Fort Collins, CO, ²Dow AgroSciences, Indianapolis, IN, ³Dow AgroSciences, Lawrenceville, GA, ⁴Dow AgroSciences, Lawrenceville, NJ (94)
- 1:45 †Soil Solarization for Weed Control in PNW Field Nurseries.** Nami Wada*, Jennifer Parke, Carol Mallory-Smith; Oregon State University, Corvallis, OR (95)
- 2:00 Biosolarization for Organic Vegetable Crop Production: Where Weed Management and Soil Health Meet.** James J. Stapleton*¹, Christopher W. Simmons², Ruth M. Dahlquist-Willard³, Yigal Achmon², Jesus D. Fernandez-Bayo², Jean S. VanderGheynst²; ¹University of California, Parlier, CA, ²University of California - Davis, Davis, CA, ³University of California, Fresno, CA (96)
- 2:15 †Evidences for Vacuolar Sequestration as Mechanism of Resistance to Paraquat in a Population of Italian Ryegrass from California.** Caio Augusto Brunharo*, Bradley D. Hanson; UC Davis, Davis, CA (97)
- 2:30 Tolpyralate Efficacy and Utility in Sweet Corn and other Vegetable Crops.** Ed Peachey*; Oregon State University, 97331, OR (98)
- 2:45 †Response of Walnuts to Simulated Drift Rates of Bispyribac-Sodium, Bensulfuron and Propanil.** Mariano F. Galla*, Kassim Al-Khatib, Bradley D. Hanson; UC Davis, Davis, CA (99)
- 3:00 Break**

- 3:15 Mesotrione: an Effective Herbicide for Use in Tree Nuts.** Joshua I. Adkins*¹, Ryan S. Bounds², Dane Bowers³, Derrick L. Hammons⁴, Monika Saini³; ¹Syngenta, Richland, WA, ²Syngenta, Visalia, CA, ³Syngenta, Greensboro, NC, ⁴Syngenta, Arbuckle, CA (100)
- 3:30 Oxyfluorfen + Penoxsulam for Preemergence and Postemergence Weed Control in Stone, Pome, Olive, and Pomegranate Trees.** Joe Armstrong*¹, Alistair H. McKay², Harvey A. Yoshida³, James P. Mueller⁴, Byron B. Sleugh⁵, Richard K. Mann⁵; ¹Dow AgroSciences, Fresno, CA, ²Dow AgroSciences, Clovis, CA, ³Dow AgroSciences, Richland, WA, ⁴Dow AgroSciences, Clayton, CA, ⁵Dow AgroSciences, Indianapolis, IN (101)
- 3:45 Multiple Years of Evaluating Amicarbazone and Methiozolin for *Poa annua* Control in Turf.** Kai Umeda*; University of Arizona, Phoenix, AZ (102)
- 4:00 Control of Broadleaf Weeds with Two New Formulations of Halauxifen-methyl (GF-3566 and GF-2687) in Cool and Warm Season Turfgrass.** Vanelle F. Peterson*¹, Jamie M. Breuninger², Anita L. Alexander³, Daniel D. Loughner⁴; ¹Dow AgroSciences, Fort Collins, CO, ²Dow AgroSciences, Indianapolis, IN, ³Dow AgroSciences, Lawrenceville, GA, ⁴Dow AgroSciences, Lawrenceville, NJ (103)
- 4:15 Sub-Lethal Glyphosate and Dicamba Doses in Dry Bean, Field Pea, and Potato.** Harlene M. Hatterman-Valenti*¹, Michael Ostlie², Gregory Endres², Brian Jenks³, Richard Zollinger¹, Andrew Robinson¹; ¹North Dakota State University, Fargo, ND, ²North Dakota State University, Carrington, ND, ³North Dakota State University, Minot, ND (104)
- 4:30 Herbicide Testing in Field-Grown Ornamentals.** Timothy W. Miller*, Carl R. Libbey; Washington State University, Mount Vernon, WA (105)

WEDNESDAY MORNING MARCH 15

Weeds of Range and Natural Areas

LOCATION: Bay 1A 1B
TIME: 9:45 AM - 11:30 AM
CHAIR & MODERATOR: Timothy Harrington
USDA Forest Service
Olympia, WA

CHAIR-ELECT: Shawna Bautista
US Forest Service
OR

*SPEAKER † STUDENT CONTEST

9:45 Four-year Survival and Growth Responses of Planted Douglas-fir to Logging Debris and Herbicide Treatments. Timothy B. Harrington*¹, David H. Peter², Robert A. Slesak³; ¹USDA Forest Service, Olympia, WA, ²U.S. Forest Service, Olympia, WA, ³University of Minnesota, Minneapolis, MN (106)

10:00 Differences in Plant Community Assembly of a Western Washington Forest Five Years after Harvesting with Various Combinations of Logging Debris Retention and Vegetation Control. David H. Peter*¹, Timothy B. Harrington²; ¹US Forest Service, Olympia, WA, ²USDA Forest Service, Olympia, WA (107)

10:15 Incipient Weed Control: Protecting Watersheds One Plant at a Time with Extreme Prejudice. James Leary¹, Kimberly Burnett², Brooke V. Mahnken*³, Chris Wada², Roberto Rodriguez²; ¹Univ of Hawaii, kula, HI, ²Univ of Hawaii at Manoa, Honolulu, HI, ³Maui Invasive Species Committee, Makawao, HI (108)

10:30 Interactive Effects of Grazing, Glyphosate Rate, and Application Timing on Barb Goatgrass Seedhead Production and Viability. Travis M. Bean*¹, Josh Davy², Elise Gornish³, Guy B. Kyser⁴; ¹University of California, Riverside, Riverside, CA, ²University of California Cooperative Extension Tehama County, Red Bluff, CA, ³University of California, Davis, Davis, CA, ⁴University of California, Davis, CA (109)

10:45 Management of Downy Brome (*Bromus tectorum*) and Ventenata (*Ventenata dubia*) with Indaziflam in Washington and Idaho Grasslands. Lindsay E. Koby*¹, Timothy Prather², Ian C. Burke¹; ¹Washington State Univ., Pullman, WA, ²Univ. of Idaho, Moscow, ID (110)

- 11:00 Indaziflam: Changing the Way Invasive Winter Annual Grasses are Managed on Non-Cropland.** Derek J. Sebastian*¹, Harry Quicke², Scott Nissen³; ¹Bayer CropScience, Fort Collins, CO, ²Bayer CropScience, Windsor, CO, ³Colorado State University, Fort Collins, CO (111)
- 11:15 Economic Impact of Noxious Weeds on Private Rangeland in Montana.** Jane Mangold*¹, Kate Binzen-Fuller¹, Stacy Davis¹, Matthew Rinella²; ¹Montana State University, Bozeman, MT, ²USDA-ARS, Miles City, MT (112)

WEDNESDAY MORNING MARCH 15

Aquatics

LOCATION: Bay 6
 TIME: 8:00 AM - 12:00 PM
 MODERATOR: Kurt Getsinger
 USAERDC
 Vicksburg, MS

***SPEAKER † STUDENT CONTEST**

- 8:00 Using Bathymetry and Plant Volume Analysis to Accurately Calculate Aquatic Applications and Record Results.** David Kluttz*; Lakeland Restoration Services, LLC, Priest River, ID (113)
- 8:15 Efficacy of Aquathol and KFD-94-10 for Curlyleaf pondweed (*Potamogeton crispus*) control under simulated fall conditions.** Jéssica Scarpin*¹, Mirella Ortiz¹, Scott Nissen¹, Cody Gray²; ¹Colorado State University, Fort Collins, CO, ²UPI, Fort Collins, CO (114)
- 8:30 Screening herbicides for management of water hyacinth in the California Bay Delta.** Guy B. Kyser*¹, John Madsen², John Miskella², Christy Morgan²; ¹University of California, Davis, CA, ²USDA-ARS, Davis, CA (115)
- 8:45 Biological control of water hyacinth in California's Delta: current status and a roadmap for the future.** Paul Pratt*; USDA/ARS, Albany, CA (117)
- 9:00 Biological control of *Phragmites* in the United States.** Mark Schwarzlaender*¹, Harriet Hinz², Patrick Haefliger²; ¹University of Idaho, Moscow, ID, ²CABI Europe-Switzerland, Delemont, Switzerland (116)

- 9:15 Impacts of Flowering Rush on Western Aquatic Resources.** Peter M. Rice*¹, Virgil Dupuis²;
¹University of Montana, Missoula, MT, ²Salish Kootenai College, Pablo, MT (118)
- 9:30 Research on the phenology of flowering rush in the western United States.** John Madsen*¹, Kurt Getsinger²; ¹USDA-ARS, Davis, CA, ²USAERDC, Vicksburg, MS (119)
- 9:45 Spread and Control of Flowering Rush in Washington and Oregon: Lakes and Rivers.** Jenifer Parsons*; Washington Department of Ecology, Yakima, WA (120)
- 10:00 Spread, Survey and Management of Flowering Rush in the Pend Oreille, a Regulated River.** Sharon L. Sorby*; Pend Oreille County, Newport, WA (121)
- 10:15 Spread and Control of Flowering Rush in Lake Pend Oreille: Large Reservoir.** Betsy I. Hull*; DOD-USACE, Oldtown, ID (122)
- 10:30 Chemical Control of Flowering Rush in the Pacific Northwest: Field Trials.** Kurt Getsinger*¹, John Madsen²; ¹USAERDC, Vicksburg, MS, ²USDA-ARS, Davis, CA (123)
- 10:45 Is Biocontrol a Future Management Option for Flowering Rush?** Jennifer E. Andreas*¹, Patrick Haefliger², Harriet Hinz², Jenifer Parsons³, Greg Haubrich⁴, Peter M. Rice⁵; ¹Washington State University Extension, Puyallup, WA, ²CABI Europe-Switzerland, Delemont, Switzerland, ³Washington Department of Ecology, Yakima, WA, ⁴Washington State Department of Agriculture, Yakima, WA, ⁵University of Montana, Missoula, MT (124)
- 11:00 Integrated Pest Management Opportunities for Flowering Rush - A Moderated Discussion.**
- 11:15 WAPMS Business Meeting.**

WEDNESDAY MORNING MARCH 15

Weeds of Agronomic Crops

LOCATION: Kidd Island/N Cape
TIME: 9:45 AM - 11:30 AM
CHAIR & MODERATOR: Caleb Dalley
NDSU
Hettinger, ND

CHAIR-ELECT: Rand Merchant
BASF
CO

***SPEAKER † STUDENT CONTEST**

- 9:45 †Survival, Growth, and Reproductive Fitness of Dicamba-Resistant Kochia in the Presence of Dicamba.** Charlemagne A. Lim*, Prashant Jha, Vipin Kumar, Shane Leland, Anjani J; Montana State University, Huntley, MT (127)
- 10:00 Polyploidy and Herbicide Resistance in *Echinochloa colona* from California.** Sarah Morran*¹, Bradley D. Hanson²; ¹The University of California, Davis, Davis, CA, ²UC Davis, Davis, CA (128)
- 10:15 †Dissipation of Soil-Applied Herbicides under Limited Irrigation.** Daniel M. Adamson*¹, Gustavo Sbatella¹, Andrew R. Kniss¹, Franck Dayan²; ¹University of Wyoming, Laramie, WY, ²Colorado State University, Fort Collins, CO (129)
- 10:30 Florasulam plus Halauxifen-methyl Premix for Preseed Weed Control in Cereals plus Sequential Postemergence Herbicide Programs.** Joseph P. Yenish*¹, Patricia Prasifka², Mike Moechnig³, Roger Gast⁴; ¹Dow AgroSciences, Billings, MT, ²Dow AgroSciences, West Fargo, ND, ³Dow AgroSciences, Toronto, SD, ⁴Dow AgroSciences, Indianapolis, IN (130)
- 10:45 †Pyroxasulfone Root vs Foliar Uptake for Control of Grasses.** Codee Z. Lee*, Kirk A. Howatt; North Dakota State University, Fargo, ND (131)
- 11:00 Florasulam plus Halauxifen-methyl Premix Combined with Fluroxypyr plus Clopyralid for Improved In-crop Control of Broadleaf Weeds in Spring Cereals.** Patricia Prasifka*¹, Michael Moechnig², Joseph P. Yenish³, Roger Gast⁴; ¹Dow AgroSciences, West Fargo, ND, ²Dow AgroSciences, Toronto, SD, ³Dow AgroSciences, Billings, MT, ⁴Dow AgroSciences, Indianapolis, IN (132)

11:15 Soybean PRE Herbicide Effectiveness with Limited Water. Mike H. Ostlie*, Gregory Endres; North Dakota State University, Carrington, ND (133)

WEDNESDAY MORNING MARCH 15

Basic Biology and Ecology

LOCATION: Casco Bay
TIME: 9:45 AM - 11:15 AM
CHAIR & MODERATOR: Bradley Hanson
UC Davis
Davis, CA
CHAIR-ELECT: Nevin Lawrence
U of Nebraska
Scottsbluff, NE

Vote Chair-Elect and Discussion:

Moving Beyond Herbicide Resistance: What are the Basic Biology and Ecology Research Needs in the Western US

WEDNESDAY MORNING MARCH 15

Awards Luncheon

LOCATION: Bay 4-5
TIME: 11:45 AM - 1:30 PM
Master of Ceremonies: Kirk Howatt
WSWS President

Elena Sanchez WSWS Outstanding Student Scholarships

Outstanding Weed Scientist

Outstanding Professional Staff/Weed Manager

Honorary Members

WSWS Fellows

WEDNESDAY AFTERNOON MARCH 15

Weeds of Range and Natural Areas

LOCATION: Bay 1A 1B
TIME: 1:45 PM - 4:45 PM
CHAIR & MODERATOR: Timothy Harrington
USDA Forest Service
Olympia, WA

CHAIR-ELECT: Shawna Bautista
US Forest Service
OR

***SPEAKER † STUDENT CONTEST**

- 1:45 †Indaziflam and Imazapic Interception and Sorption by Downy Brome, Medusahead, and Ventenata Residue.** Shannon L. Clark*¹, Derek J. Sebastian², Scott Nissen¹; ¹Colorado State University, Fort Collins, CO, ²Bayer CropScience, Fort Collins, CO (134)
- 2:00 Co-invasions: Are Two Similar Invaders Worse than One?** Daniel Tekiela*¹, Jacob N. Barney²; ¹University of Wyoming, Laramie, WY, ²Virginia Tech, Blacksburg, WY (135)
- 2:15 †Vernalization Effects on the Translocation of Aminopyralid and Clopyralid in Rush Skeletonweed (*Chondrilla juncea* L.).** Tara Burke*, Alan J. Raeder, Ian C. Burke; Washington State University, Pullman, WA (136)
- 2:30 Revealing the Distribution and Indicators of *Ventenata dubia* Invasion in Sagebrush Steppe Rangelands.** Lisa C. Jones*¹, Nicholas Norton², Timothy Prather¹; ¹University of Idaho, Moscow, ID, ²Palouse Land Trust, Moscow, ID (137)
- 2:45 †Evaluating the Use of Thresholds Concepts for Improving Habitat through Downy Brome Management.** Clay W. Wood*¹, Brian A. Meador²; ¹University of Wyoming, Laramie, WY, ²University of Wyoming, Sheridan, WY (138)
- 3:00 Break**
- 3:15 Can Diet Training Increase Cattle Use of Spotted Knapweed?** Jeffrey C. Mosley*¹, Brent L. Roeder², T. Rene Kittle³, Jodi L. Pauley⁴, Jane M. Mangold¹, Tracy K. Mosley⁵, Daniel E. Lucas⁶, Gerald Marks⁷; ¹Montana State University Extension, Bozeman, MT, ²Montana State University Extension, Choteau, MT, ³Montana State University Extension, Polson, MT, ⁴Montana State University Extension, Deer Lodge,

MT, ⁵Montana State University Extension, Livingston, MT, ⁶Montana State University Extension, Philipsburg, MT, ⁷Montana State University Extension, Missoula, MT (139)

- 3:30 Plant Community Response to Aminocyclopyrachlor.** Peter M. Rice*; University of Montana, Missoula, MT (140)
- 3:45 Discussion: Study and Application of Weed Risk Models in Plant Community Restoration**

WEDNESDAY AFTERNOON MARCH 15

Aquatics

LOCATION: Bay 6
TIME: 1:30 PM - 3:00 PM
MODERATOR: Mark Schwarzlaender
University of Idaho
Moscow, ID

***SPEAKER † STUDENT CONTEST**

- 1:30 Genetic variation and management of Eurasian watermilfoil.** Ryan A. Thum*; Montana State University, Bozeman, MT (141)
- 1:45 Control Efforts of Invasive Watermilfoil in Noxon Reservoir, MT.** Kim Bergstrom*; Sanders County Aquatic Invasive Plants Task Force, Thompson Falls, MT (142)
- 2:00 Eradication of Eurasian watermilfoil in Beaver Lake, MT by diver dredge.** Erik Hanson*; Hanson Environmental, Missoula, MT (143)
- 2:15 Twin Falls County: Aquatic Weed Challenges.** Kali Sherrill*; Twin Falls County, Murtaugh, ID (144)
- 2:30 Hydrilla Eradication in Idaho.** Bethany Muffley*¹, Thomas Woolf²; ¹Idaho State Department of Agriculture, Boise, ID, ²Idaho Department of Agriculture, Hayden, ID (145)
- 2:45 Short Duration Teton Slug Treatments in Irrigation Canal Systems: SCBID Trial Treatments.** Cory Greer*; South Columbia Basin Irrigation District, Mesa, WA (146)

WEDNESDAY AFTERNOON MARCH 15

Weeds of Agronomic Crops

LOCATION: Kidd Island/N Cape
TIME: 1:45 PM - 3:00 PM
MODERATOR: Caleb Dalley
NDSU
Hettinger, ND

CHAIR-ELECT: Rand Merchant
BASF
CO

***SPEAKER † STUDENT CONTEST**

- 1:45 Weed Control and Crop Response in Dicamba Tolerant Soybean.** Gregory J. Endres*¹, Michael Ostlie², J. Paulo Flores²; ¹NDSU, Carrington, ND, ²North Dakota State University, Carrington, ND (147)
- 2:00 Xtend Crop System.** Chris M. Mayo*; Monsanto, Gardner, KS (148)
- 2:15 Discussion: Herbicide Drift and Nozzle Selection for Weed Control Research in Agronomic Crops**

WEDNESDAY AFTERNOON MARCH 15

Aquatics

LOCATION: Bay 6
TIME: 3:15 PM - 5:00 PM
MODERATOR: Mike Lehman
Contra Costa Water District
Concord, CA

***SPEAKER † STUDENT CONTEST**

- 3:15 Technical status of invasive watermilfoil management in the US and future outlook for improved control practices.** Scott Shuler*, Mark A. Heilman; SePRO Corporation, Carmel, IN (149)
- 3:30 †Translocation of ¹⁴C-Endothall in Eurasian Watermilfoil and Two Hydrilla Biotypes.** Mirella Ortiz*¹, Scott Nissen¹, Kallie Kessler¹, Cody Gray²; ¹Colorado State University, Fort Collins, CO, ²UPI, Fort Collins, CO (150)

- 3:45 Evaluations of Procellacor™ for future selective herbicide management of invasive watermilfoils and other Western US aquatic invasive plants.** Mark A. Heilman*¹, Michael D. Netherland², Jens P. Beets³, Amy P. Smagula⁴, Ben E. Willis⁵; ¹SePRO Corporation, Carmel, IN, ²USAERDC, Gainesville, FL, ³University of Florida, Gainesville, FL, ⁴New Hampshire Department of Environmental Services, Concord, NH, ⁵SePRO Corporation, Whitakers, NC (151)
- 4:00 †Evaluating Efficacy of Endothall Treatment on Eurasian and Hybrid Watermilfoil in Jefferson Slough, Montana.** Paula Guastello*, Ryan A. Thum; Montana State University, Bozeman, MT (152)
- 4:15 †Procellacor: concentration exposure time trials.** Erika J. Haug*, Rob Richardson; North Carolina State University, Raleigh, NC (153)
- 4:30 Dissolved phosphorus enrichment for the suppression of Didymo (*Didymosphenia geminata*) nuisance mats in the Kootenai River, Libby, MT.** Mary K Vivian*, Frank M. Wilhelm; University of Idaho, Moscow, ID (154)
- 4:45 Washington State Department of Ecology's Harmful Algal Blooms (HAB) program.** Lizbeth Seebacher*; Washington Department of Ecology, Olympia, WA (155)

WEDNESDAY AFTERNOON MARCH 15

Education and Regulatory

LOCATION: Kidd Island/N Cape
 TIME: 3:15 PM - 4:45 PM
 CHAIR: Brian Jenks
 NDSU
 Minot, ND
 CHAIR-ELECT: Dirk Baker
 Campbell Scientific
 Logan, UT
 MODERATOR: Robert Norris
 University of California
 Davis, CA

***SPEAKER**

- 3:15 Macro-photography: the Focus Stacking Revolution.** Robert F. Norris*; University of California, Davis, CA (156)

WEDNESDAY AFTERNOON MARCH 15

Education and Regulatory

LOCATION: Casco Bay
TIME: 1:45 PM - 4:30 PM
CHAIR: Brian Jenks
CHAIR-ELECT: Dirk Baker
MODERATOR: Sandra McDonald
Mountain West Pest
Fort Collins, CO

***SPEAKER**

1:45 Risk Communication. Kaci J. Buhl*; Oregon State University, Corvallis, OR (157)

3:00 Break

3:15 Discussion: Risk Communication

WEDNESDAY AFTERNOON MARCH 15

What's New In Industry

LOCATION: Bay 4-5
TIME: 5:00 PM - 6:15 PM
MODERATOR: Charlie Hicks
Bayer CropScience
Fort Collins, CO

THURSDAY MORNING MARCH 16

Business Breakfast

LOCATION: Bay 4-5
TIME: 6:30 AM - 9:15 AM
MODERATOR: Kirk Howatt
North Dakota State University
Fargo, ND

THURSDAY MORNING MARCH 16

Teaching and Technology Transfer

LOCATION: Bay 2
TIME: 9:30 AM - 11:30 AM
CHAIR & MODERATOR: Jenna Meeks
U of Wyoming
Laramie, WY

CHAIR ELECT: Dan Tekiela
U of WY
Laramie, WY

***SPEAKER**

- 9:30 Weed Science in China: Opportunities and Challenges.** Zhaohu Li*; China Agricultural University, Beijing, Peoples Republic (158)
- 9:45 Assessing Inexpensive Temperature Loggers: Do They Provide Good Data?** Dirk V. Baker*; Campbell Scientific, Inc, Logan, UT (159)
- 10:00 Does Pulse-Sprayer Technology Affect Herbicide Efficacy?** Kirk A. Howatt*¹, Michael J. Christoffers¹, Thomas J. Peters¹, Jason W. Adams²; ¹North Dakota State University, Fargo, ND, ²North Dakota State University, FARGO, ND (160)
- 10:15 Framing Herbicide Resistance – How Farmers Employ Techno-Optimism to Justify Reliance on Herbicidal Weed Management.** Katherine Dentzman*; Michigan State University, East Lansing, MI (161)
- 10:30 The Herbicide Property Tool (HPT) from the National Pesticide Information Center at Oregon State University can be Useful in Teaching, Research and Extension activities.** Kaci J. Buhl*, Brittany Hanson, Alicia Leytem, Sean Ross; Oregon State University, Corvallis, OR (162)
- 10:45 Discussion: Open Access Publishing for the Open-Minded**

THURSDAY MORNING MARCH 16

Weeds of Agronomic Crops

LOCATION: Bay 3
TIME: 9:30 AM - 11:00 AM
CHAIR & MODERATOR: Caleb Dalley
NDSU
Hettinger, ND
Rand Merchant
BASF
CHAIR-ELECT: CO

***SPEAKER † STUDENT CONTEST**

- 9:30 Biology and Management of Scouringrush in Dryland Winter Wheat.** Blake D. Kerbs¹, Andrew G. Hulting^{*1}, Drew Lyon²; ¹Oregon State University, Corvallis, OR, ²Washington State University, Pullman, WA (163)
- 9:45 Confirmation and Mechanism of Resistance to Imazamox in Downy Brome (*Bromus tectorum* L.) from Montana.** Vipin Kumar^{*1}, Prashant Jha², Anjani J¹, Shane Leland¹; ¹Montana State University, Huntley, MT, ²Montana State University, Huntley, MT (164)
- 10:00 Bicyclopyrone + Bromoxynil: Broadleaf Weed Control in Cereals.** Peter C. Forster^{*1}, Donald J. Porter², Monika Saini³; ¹Syngenta Crop Protection, Eaton, CO, ²Syngenta Crop Protection, Greensboro, NC, ³Syngenta, Greensboro, NC (165)
- 10:15 Hyperspectral Imaging to Detect Herbicide-Resistant Weeds In-Crop: Convergence of Optical and Ag Technologies.** Prashant Jha^{*1}, Joe Shaw², Vipin Kumar¹, Paul Nugent²; ¹Montana State University, Huntley, MT, ²Montana State University, Bozeman, MT (166)
- 10:30 Decomposition of *Brassicaceae* Residues Under Different Tillage Methods and the Impacts on Ascospore Survival and Spread in the Crop.** Pete A. Berry^{*}; Oregon State University, Corvallis, OR (167)
- 10:45 A Meta-Analysis of Field Bindweed (*Convolvulus arvensis*) and Canada Thistle (*Cirsium arvense*) Management in Organic Agricultural Systems.** Noelle Orloff, Fabian Menalled^{*}, Jane Mangold, Miller Zachariah; Montana State University, Bozeman, MT (168)

Education and Regulatory

Climate Change on weed biology, ecology, and management

LOCATION: Bay 4-5
TIME: 9:30 AM - 1:00 PM
CHAIR: Brian Jenks
CHAIR-ELECT: Dirk Baker
MODERATOR: Erik Lehnhoff
Montana State University
Bozeman, MT

***SPEAKER**

- 9:30 Moderator introduction**
- 9:35 Climate Change and Weed Biology.** Ian C. Burke*; Washington State University, Pullman, WA (169)
- 10:00 Impacts of Climate Change on Invasive Species Distributions and Interactions with Native Species.** Matt Germino*; USGS, Boise, ID (170)
- 10:25 Rangeland Production as Affected by Climate Change.** Matt Reeves*; USFS, Missoula, MT (171)
- 10:50 Climate Change and Invasive Grasses.** Lisa J. Rew*; Montana State University, Bozeman, MT (172)
- 11:15 Climate Change, Extreme Events and Invasion.** David Clements*; Trinity Western University, Langley, BC (173)
- 11:40 Biological Control and Climate Change.** Sharlene Sing*; USFS, Bozeman, MT (174)
- 12:05 Agricultural Professionals' Perceptions about Climate Change.** Irene Grimberg*; Montana State University, Bozeman, MT (175)
- 12:30 Discussion**

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WSWS PAST PRESIDENTS

1938	H. L. Spence, Jr.	1983	J. Wayne Whitworth
1940	G. R. Hyslop	1984	Gary Massey
1941	C. L. Corkins	1985	E. Stanley Heathman
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1960	Richard A. Fosse	1998	Barbra Mullin
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1970	Harold P. Alley	2005	Phil Stahlman
1971	Kenneth W. Dunster	2006	Phil Banks
1972	Arnold P. Appleby	2007	Kassim Al-Khatib
1973	David E. Bayer	2008	Ron Crockett
1974	D. Burgoyne	2009	Dan Ball
1975	Gary A. Lee	2010	Jesse Richardson
1976	William L. Anliker	2011	Joe DiTomaso
1977	Clyde L. Elmore	2012	Vanelle Peterson
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1990	Earl Spurrier
1992	Bruce Ames
1993	Jerry Caulder
1994	Will D. Carpenter
1995	K. James Fornstrom
1997	F. Dan Hess
2001	Darrell Hanavan
2002	Senator Larry Craig - Idaho
2003	Roy Nishimoto
2004	Doug Schmale
2006	Wanda Graves
2007	Rob Hedberg
2008	Robert Zemetra
2009	Tom Brokaw
2010	Harry Cline
2011	A. G. Kawamura
2014	David Armstrong

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1968	Robert B. Balcom	1993	Paul J. Ogg
	Walter S. Ball		Peter K. Fay
	Alden S. Crafts	1994	Sheldon E. Blank
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1970	Lee M. Burge		Robert Parker
	Bruce Thornton	1997	Steven A. Dewey
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	W.A. Harvey	1998	Doug K. Ryerson
1972	H. Fred Arle		Tom D. Whitson
	Boysie E. Day	1999	Charlotte V. Eberlein
1973	Harold P. Alley		John E. Orr
	K.C. Hamilton	2000	Rodney G. Lym
1974	William R. Furtick		Frank L. Young
	Oliver A. Leonard	2001	Barbra Mullin
1975	Richard A. Fosse		Jill Schroeder
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1976	Arnold P. Appleby		Philip Westra
1977	J. LaMar Anderson	2003	Vanelle Peterson
	Arthur H. Lange		Carol Mallory-Smith
1978	David E. Bayer	2004	Don Morishita
	Kenneth W. Dunster		Phil Banks
1979	Louis A. Jensen	2005	Nelroy Jackson
	Gary A. Lee		Roland Shirman
1980	W.L. Anliker	2006	Celestine Duncan
1981	P. Eugene Heikes		Joan Campbell
	J. Wayne Whitworth	2007	Bill Cobb
1982	Bert L. Bohmont		Phil Stahlman
	Lowell S. Jordan	2008	K. George Beck
1983	Richard D. Comes		Rick Boydston
	Clyde L. Elmore	2009	Kassim Al-Khatib
1984	Larry C. Burrill		Scott Nissen
1985	L.E. "Jack" Warren	2010	Tracy Sterling
1986	Dwight V. Peabody		Rick Arnold
	Robert L. Zimdahl	2011	Daniel A. Ball
1987	Alex G. Ogg, Jr.		Roger Gast
	Jean H. Dawson	2012	Jodie Holt
1988	Harvey D. Tripple		Lars Anderson
	E. Stan Heathman	2013	Tim Miller
1989	John O. Evans		Tom Lanini
	W.B. "Jim" McHenry	2014	Robert Stougaard
1990	Harry S. Agamalian		Robert Norris
	Bart A. Brinkman	2015	Pete Forster
1991	Larry W. Mitich		Gilbert Cook
	Edward E. Schweizer	2016	Joseph DiTomaso
1992	Donald C. Thill		Jesse Richardson
	Harold M. Kempen		

OUTSTANDING WEED SCIENTISTS

1989	Jean H. Dawson	2004	Ron P. Crockett
1990	Arnold P. Appleby		Joe DiTomaso
1991	Stephen D. Miller		Jim Vandecoeveering
	Harvey D. Tripple	2005	Kassim Al-Khatib
1992	Alex G. Ogg, Jr.		Kelly Luff
	Kenneth W. Dunster	2006	Rick Arnold
1993	Edward E. Schweizer	2007	John Fenderson
	Sheldon E. Blank		Rod Lym
1994	Larry C. Burrill	2008	Robert G. Wilson
1995	Larry W. Mitich		Leo Charvat
	Paul J. Ogg		Pat Clay
1996	Donald C. Thill	2009	Carol Mallory-Smith
	Neal R. Hageman		Pete Forster
1997	Jeff Tichota		Alan Helm
	Harry S. Agamalian	2010	Drew Lyon
1998	Donald R. Colbert		Ian Burke
	Clyde L. Elmore	2011	Monte D. Anderson
1999	Gus J. Foster		Bradley D. Hanson
	Philip Westra	2012	Brett Oemichen
2000	Bart Brinkman		Andrew Kniss
	K. George Beck	2013	Mary Halstvedt
2001	John E. Orr		Jane Mangold
	Phillip W. Stahlman	2014	Charlie Hicks
2002	Doug Ryerson	2015	Brian Mealor
	Tom Whitson	2016	Prashant Jha
2003	Frank Young		

OUTSTANDING ACHIEVEMENT AWARDS

2003	Bill Brewster	Professional Staff
2005	Guy Kyser	Professional Staff
	Eric Lane	Weed Manager
2006	Ed Peachy	Professional Staff
2007	Jim Freeman	Weed Manager
	Carl Libbey	Professional Staff
2008	Lars Baker	Weed Manager
	Lori Howlett	Professional Staff
2009	April Fletcher	Weed Manager
	Gary Willoughby	Professional Staff
2010	Cheryl Fiore	Professional Staff
2011	Robert Higgins	Professional Staff
2012	James Sebastian	Professional Staff
	Jerry Asher	Weed Manager
2013	Joan Campbell	Professional Staff
	Tim D'Amato	Weed Manager
2014	Ed Davis	Professional Staff
	Rita Beard	Weed Manager
2015	Brent Beutler	Professional Staff

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1994	Rodney G. Lym
1995	John E. Orr
1996	Steven A. Dewey
1997	Jill Schroeder
1999	Celestine Duncan
2000	Gus Foster
2001	Jack Schlesselman
2002	Tom Whitson
2003	Nelroy Jackson
2004	Joan Campbell
2005	Tony White
2006	Janet Clark
2007	Tim Miller
2009	Mike Edwards
2010	Phil Motooka
2011	Kai Umeda
2012	Tim Miller
2013	Phil Banks
2014	Carl Libbey
2015	Carol Mallory-Smith
2016	Roland Schirman

WSWS Committees 2016-17

Board contact *italicized*. (Year to rotate off of committee in parenthesis)

Awards

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Roger Gast, Chair (2018)
Gustavo Sbatella (2019)

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Kassim al-Khatib, Chair (2018)
Bill Cobb (2019)

Finance

Jesse Richardson (2017)
Stephen Valenti, Chair (2018)
Josh Adkins (2019)

Herbicide Resistant Plants

Prashant Jha (2017)
Marie Jansieniuk, Chair (2018)
Joan Campbell (2019)
Tara Burke, Student Rep

Program

Monte Anderson, Chair (2017)
Prashant Jha (2017)
Brian Jenks (2017)

Publications

Monte Anderson, Chair
Bill McCloskey, Proceedings
Traci Rauch, Research Prog. Report
Carl Libbey, Newsletter Co-Editor
Phil Banks, Website Editor

Student Paper Judging

Ryan Rector (2017)
Joel Felix, Chair (2018)
Ryan Edwards (2019)
Eric Patterson, Student Rep

Legislative

Fred Raish (2017)
James Leary, Chair (2018)
Patti Prasifka (2019)
Lee Van Wychen, Ex-officio

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Scott Cook, Chair (2018)
Travis Bean (2019)

Necrology

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Judit Barasso, Chair (2018)
John Frihauf (2019)

Nominations

Scott Nissen (2017)
Steve Eskelson, Chair (2018)
Ryan Rapp (2019)
Joe Yenish, Past-President

Poster

Kirk Sager (2017)
Jared Unverzagt, Chair (2018)
Alan Helm (2019)

Public Relations

Joan Campbell (2017)
Todd Neel (2017)
Lynn Sosnoskie, Chair (2018)
Travis Bean, Co-Chair (2018)
Kai Umeda (2019)
Pat Clay (2019)

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Charlie Hicks (2017)
Joseph Yenish, Chair (2018)
Steve Eskelsen (2019)

Sustaining Membership

Wendell Rich (2017)
Craig Alford, Chair (2018)
Ryan Rector (2019)

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NOTES

THANK YOU!

The WSWS members thank the Sustaining Members of the WSWS for their support. We would also like to thank the industry sponsors listed below for providing refreshments for the retiree reception and meeting breaks and for hosting the graduate student, spouses, and business breakfasts. Please thank the sustaining members and sponsors for their generosity and support of the society. The Program and Local Arrangements Committees would like to **thank Pete Forster** for making the arrangements for all of the sponsored activities.

BASF Corporation

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2017 WSWS Sustaining Members

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United Phosphorus, Inc.
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FUTURE MEETING DATES AND SITES

March 12-15, 2018
Garden Grove, CA

March 11-14, 2019
Denver, CO

TIME	TUESDAY	WEDNESDAY	THURSDAY
6:30			WSWS Business Breakfast and Student Awards Bay 4-5
6:45			
7:00			
7:30			
7:45	Poster Session Odd # Authors Present Bay 2-3	Poster Session Even # Authors Present Bay 2-3	
8:00			
8:15			
8:30			
8:45			
9:00			
9:15			
9:30	General Session Bay 4-5		
9:45			
10:00			
10:15			
10:30			
10:45			
11:00			
11:15			
11:30			
11:45			
12:00		WSWS Awards Luncheon	
1:15		Bay 4-5	
1:30			
1:45			
2:00			
2:15			
2:30			
2:45			
3:00			
3:15			
3:30			
3:45			
4:00			
4:15			
4:30			
4:45			
5:00		What's New in Industry? Bay 4-5	
5:15			
5:30			
5:45			
6:00			