



 2<sup>nd</sup> Wyoming UAV Symposium



University of Wyoming Conference Center, Laramie, WY | May 30 and 31, 2018

# THANKS TO OUR SPONSORS AND EXHIBITORS

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# 2<sup>nd</sup> Wyoming UAV Symposium



On behalf of the Wyoming Geographic Information Science Center (WyGISC) and the University of Wyoming, the planning committee welcomes you to the 2<sup>nd</sup> Wyoming UAV Symposium. We look forward to two full days of learning about the advances in drone technology in the form of a) new sensors capable of acquiring data of natural and man-made systems, b) software programs that are capable of processing those data, and c) state-of-the-art applications. There will be several opportunities to interact with the speakers and experts throughout the event.

We thank our sponsors for their financial support to host this event, the speakers for sharing their expertise and the exhibitors for showcasing the recent developments in this technology. We extend our sincere thanks to UW Catering and Events for their support to host this event in the Conference Center.

Thank you for being a part of this symposium. We appreciate your participation and hope you'll provide your feedback, so we can continue to improve future events.

Welcome to the University of Wyoming and to Laramie!

Sincerely,

**The 2018 WY UAV Symposium Program Committee**

Paddington Hodza (*Finance*)

Ramesh Sivanpillai (*Technical Program*)

Beth Leonard (*Accounts, Receipts, Registration*)

Emily Sorenson (*Event Coordination*)

Teal Wyckoff (*Website*)

Many of the video presentations and accompanying PowerPoint slides will be available after the symposium at [http://www.uwyo.edu/wygisc/uav\\_symposium/uav\\_2018.html](http://www.uwyo.edu/wygisc/uav_symposium/uav_2018.html).



# AGENDA

## Wednesday, May 30

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- 7:00 AM – 8:00 AM Registration Open and Continental Breakfast
- 8:00 AM **Welcome: Dr. Paddington Hodza**, Acting Director, WyGISC
- 8:10 AM **Opening Remarks: Dr. Laurie Nichols**, President, University of Wyoming
- 8:20 AM **Review of Day's Events: Dr. Ramesh Sivanpillai**, Research Scientist, WyGISC
- 8:30 AM – 9:00 AM *Organizational risk management of UAS operations that touches on the need to incorporate stakeholders from I.T., Safety, Legal, Insurance, Strategic sourcing / supply chain, and Security to manage all associated risk areas*  
**Calvin Rieb**, Vice President, Helicopter & Unmanned Services, PRISM Solutions, CO
- 9:00 AM – 9:30 AM *Legal Issues Concerning Drone Users*  
**Curtis Clabaugh**, State Photogrammetry and Surveys Engineer, Wyoming Department of Transportation, WY
- 9:30 AM – 10:00 AM *The MagArrow™: An Innovative Drone-Enabled Magnetometer*  
**Ron Bell**, President of Operations, International Geophysical Services, LLC, CO
- 10:00 AM – 10:30 AM *Recent Advances in Hardware, Flight Controller Software, and Use of AI for Autonomous UAVs*  
**Dr. Olivier Brousse**, CEO, 3D Vistas, CO
- 10:30 AM – 11:00 AM Networking Break  
*Please visit with our sponsors and poster presenters*
- 11:00 AM – 11:40 AM *Risk management at the RPIC & manager level for UAS operations. Touching on flight risk assessments, airspace site surveys, safety reporting, checklists, briefing processes and establishing risk thresholds*  
**Calvin Rieb**, Vice President, Helicopter & Unmanned Services, PRISM Solutions, CO
- 11:40 AM – 12:10 PM *The One-Stop Data-Processing Shop: IMAGINE UAV, Hexagon Smart M.App and GeoApp.UAS*  
**Michael Ann Lane**, Global Education Manager, Hexagon Geospatial, CO
- 12:10 PM – 1:20 PM **Lunch**  
Keynote Address: *Drones in Environmental Sciences: A Quick Tour of Promises, Lies and Future Applications*  
**Dr. Javier Leon**, Senior Lecturer and Physical Geography Program Coordinator, University of the Sunshine Coast, Queensland, Australia

1:20 PM – 1:50 PM	<i>LizardTech's Image Asset Handling Tools for the UAS-User Community</i> Terry Ryan, Federal Sales Manager, LizardTech, CO Jeffrey Young, Global Business Development, LizardTech, CO
1:50 PM – 2:20 PM	<i>Drone2Map for ArcGIS: Bring Drone Imagery into ArcGIS</i> Jeremiah Lindemann, Solution Engineer/Geographer, Esri, CO
2:20 PM – 2:45 PM	Networking Break <i>Please visit with our sponsors and poster presenters</i>
2:45 PM – 3:15 PM	<i>Building custom drones for crop dusting and monitoring thermal plumes</i> Bill Moudy, Unmanned Aerial Systems Specialist, Owlsight Inc., CO
3:15 PM – 3:45 PM	<i>Apps for Ground truthing Remote Imagery</i> Alan Telck, President, AgTerra Technologies, WY
3:45 PM – 4:00 PM	<i>Factors to consider prior to integrating UAVs in the Experiment Station's Research</i> Brian Lee, Wyoming Agricultural Experiment Station, WY
4:00 PM – 5:30 PM	Poster Session and Demos ( <i>Titles and presenters are listed at the end of this booklet.</i> )

## Thursday, May 31

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7:00 AM – 7:55 AM	Registration Open and Continental Breakfast
7:55 AM	<b>Welcome: Dr. Paddington Hodza</b> , Acting Director, WyGIS
8:00 AM	<b>Opening Remarks: Dr. Kate Miller</b> , Provost/Vice President for Academic Affairs, University of Wyoming
8:10 AM	<b>Review of Day's Events: Dr. Ramesh Sivanpillai</b> , Research Scientist, WyGIS
8:15 AM – 9:15 AM	Keynote Address: <i>Role of UAVs for Collecting Remotely-Sensed Data</i> Jeff Sloan, Project Leader, USGS National Unmanned Aircraft Systems Project Office, CO
9:15 AM – 10:35 AM	<i>USDA/APHIS/Wildlife Services Use of UAS for Wildlife Applications</i> Justin Fischer, Geographer, USDA APHIS National Wildlife Research Center (NWRC), CO <i>Timing and Scale Matters; Unmanned Aircraft vs. Satellite Imagery in Plant Invasion Monitoring</i> Dr. Jana Mullerova, Deputy Head of the Department of GIS and Remote Sensing, Institute of Botany, Czech Academy of Sciences, Pruhonice, Czech Republic <i>UAV Remote Sensing for Irrigation Management</i> Dr. Huihui Zhang, Research Physical Scientist, Water Management & Systems Research Unit (WMSRU), USDA-Agricultural Research Service, CO <i>Farming Reinvented: How UAV's are Changing Farming Forever</i> Robert Houchell, FAA-Certified Drone Pilot, Just Drone It, CO

10:35 AM – 11:10 AM	Networking Break and Demos <i>Please visit with our sponsors and poster presenters</i>
11:10 AM – 11:30 AM	<b><i>UAV Airborne Magnetometry for Geophysical Exploration and Un-Exploded Ordinance Detection: Worldwide Results</i></b> <b>Dr. Olivier Brousse</b> , CEO, 3D Vistas, CO
11:30 AM – 11:50 AM	<b><i>Locating Poorly Documented Oil and Gas Wells Using Low Altitude Aeromagnetic Surveys</i></b> <b>Ron Bell</b> , President of Operations, International Geophysical Services, LLC, CO
11:50 AM – 1:10 PM	<b>Lunch</b> Keynote Address: <b><i>Current and Future Challenges of Vegetation Mapping Using Drones</i></b> <b>Dr. Gregory Crutsinger</b> , Founder, Scholar Farms, CA
1:20 PM – 2:10 PM	<b><i>FAA Remote Pilot Certification Exam (panel discussion)</i></b> <b>Elizabeth Traver</b> , SSSL Manager, EPSCoR-IDEA, University of Wyoming, WY <b>Shannon Helvie</b> , FAA-Licensed Drone Pilot, EagleiMedia LLC, CO
2:10 PM – 2:45 PM	Networking Break and Demos <i>Please visit with our sponsors and poster presenters</i>
2:45 PM – 3:45 PM	<b><i>Photogrammetry Applications with Drone Imagery</i></b> <b>Chris Leatherman</b> , Wyoming Ambassador and Certified FAA Drone Pilot, Aerial Solutions of Wyoming, WY <b><i>Modeling Headcut Using Ground- and UAV-Based Imagery in western Wyoming</i></b> <b>Sam Cox</b> , Natural Resource Department, U.S. Department of Interior (USDOI)/Bureau of Land Management (BLM), WY <b><i>Drones for Storytelling and Video Production</i></b> <b>David Keto</b> , Media Producer/Director, UW Extension, University of Wyoming, WY <b>Kyle Spradley</b> , Photographer/Videographer, Institutional Marketing, University of Wyoming, WY
3:45 PM – 4:15 PM	<b><i>UAV Career Tips for Future Workforce (panel discussion)</i></b>
4:15 PM – 4:30 PM	Event Wrap-Up

# SPECIAL GUESTS

## Dr. Laurie Nichols

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President, University of Wyoming, WY



Laurie Nichols began her duties as UW's 26th president May 16, 2016.

President Nichols had been the provost and executive vice president for academic affairs at South Dakota State University since 2009, helping the university of about

12,600 students advance on a number of fronts. Before that, she was dean of the SDSU College of Education and Human Sciences from 1994 to 2008. From August 2008 through mid-June 2009, Dr. Nichols served as interim president of Northern State University in Aberdeen, S.D. She began her career in higher education as a member of the faculty of the University of Idaho from 1988 to 1994.

President Nichols was born and raised in South Dakota. A first-generation college graduate, she received a bachelor's degree in education from South Dakota State in 1978. She then earned a master's degree in vocational and adult education from Colorado State University in 1984 and a Ph.D. in family and consumer sciences education from Ohio State University in 1988.

She and her husband, Tim, have two adult daughters.

## Dr. Kate Miller

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Provost and Vice President, UW Office of Academic Affairs, WY



A graduate of Princeton University with an A.B. Geological and Geophysical Sciences, and Stanford University with an M.S. (1988) and Ph.D. (1991) in Geophysics, Kate joined UW in August 2016 as the Provost and Vice President for Academic Affairs and a

professor of Geology and Geophysics. Prior to her appointment at UW, she was Dean of the College of Geosciences at Texas A&M University (2009-2016) and a faculty member in Geological Sciences and administrator at the University of Texas at El Paso (1991-2009). She began her professional career as a geoscientist with Amoco Production Company (now BP) in 1982.

Dr. Miller's research has focused primarily on the application of active source seismology to the origin and evolution of the continents. In recent years, this work has resulted in student research and publications on the west coast of North America, the Rocky Mountains, the Great Plains, and central and eastern Europe. Recent projects have included projects funded by the National Science Foundation for geophysical work in the Big Horn Mountains of Wyoming and the Coast Ranges of British Columbia. She has also long been engaged in using geophysics to better understand earthquakes and other environmental hazards. Her work has been extensively funded by a variety of state and federal agencies.

She also has long-standing interests in enhancing diversity in STEM education, especially in the geosciences. She has led a number of training grants related to recruitment and retention of minorities in the geosciences and math and science education with funding from the National Science Foundation and major corporations.

# PRESENTER BIOGRAPHIES

## Calvin Rieb

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Vice President, Helicopter & Unmanned Services, PRISM, CO



Calvin Rieb is the Vice President of Helicopter & Unmanned Services at PRISM, which is a wholly-owned subsidiary of ARGUS International. Mr. Rieb is a graduate of Embry-Riddle Aeronautical University and a certified

Project Management Professional (PMP), who possesses over 14 years of aviation safety management expertise with real world experience in SMS from the DoD and commercial sector. Mr. Rieb has most notably been at the leading front of developing safety systems, safety software applications, documentation and planning for the safe integration of Helicopter & UAS operations for various corporations and government entities.

Mr. Rieb is a rated Army aviator with experience piloting the UH-60 and C-12 aircraft with global deployments. Prior to becoming a pilot, Mr. Rieb worked as a UH60 Mechanic and managed the line at a small FBO. FAA Ratings include; Commercial and Instrument for Airplane Single / Multiengine and Helicopter, a Remote Pilot Certificate and a BE200 type rating. Today Mr. Rieb works with a wide array of Helicopter & UAS operators and enjoys flying the C-12 for the Army Guard part-time.

## Curtis Clabaugh

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State Photogrammetry and Surveys Engineer, WYDOT, WY



Curtis is a long-term employee with the Wyoming Department of Transportation, serving at the organization for 42 years. He began his tenure on the construction side of the organization (for 17 years) before moving to his current position as the State Photogrammetry and Surveys Engineer.

Curtis is graduate of the University of Wyoming, a Professional Engineer and a Professional Photogrammetric Surveyor.

He served two terms as chair of the Transportation Research Board (TRB) committee AFB80 on Geospatial Technologies for Design and Construction and is currently serving as the Chair for the Transportation Research Board subcommittee AFB80(2) Small Unmanned Aerial Vehicles (sUAV).

He has also served four different times as the American Society of Photogrammetry & Remote Sensing chair for the Transportation Surveys Committee.

Curtis was recently made an Emeritus member of TRB.



## Ronald S. Bell

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President of Operations, International Aerobotic Geophysical Services, LLC, CO



Ron has more than three decades of experience applying a broad variety of geophysical methods to resource exploration and environmental subsurface site characterization. In 2014, his focus shifted to the application of small unmanned aerial systems (sUAS)

equipped with a magnetometer to map geology and detect buried ferromagnetic objects.

In 2015, Ron formed Aerobotic Geophysical Systems, LLC. (AGS) to design, build, and market drone enabled geophysical data acquisition systems. During 2017, AGS conducted field trials of a prototype version of the MagArrow™, an innovative drone enabled magnetometer using the micro fabricated atomic magnetometer (MFAM) technology developed by Geometrics, Inc. of San Jose, California. AGS recently became an authorized reseller of the MagArrow™ and MFAM technologies.

Ron is also President and Senior Geophysicist of International Geophysical Services, Inc. (IGS), a geophysical consulting and services company offering drone enabled low altitude magnetic surveys for resource exploration and environmental site characterization. In addition, IGS performs DC resistivity, induced polarization (IP), and electromagnetic Induction (EMI) conductivity subsurface imaging surveys for mineral, ground water, and hydrocarbon exploration, geotechnical investigations, and environmental site characterization.

## Dr. Olivier Brousse

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CEO, 3D Vistas, CO



Dr. Olivier Brousse is the CEO of 3D Vistas, a Colorado company specializing in drones for research and industry. After a first career holding a number of technical and executive positions in the IT world domestically and abroad, Olivier

caught the “drone” and robotics bug 10 years ago, and began building multirotors from scratch. An active UAV participant and researcher, he saw firsthand the field mature to its present state, where he can safely and reliably fly autonomous multi-kilometer missions at the flick of a switch.

Today he is the founder of 3DVistas, a company that researches, designs, builds and flies professional autonomous drones for a wide range of research and industry advanced applications and payloads, with customers and partners as diverse as the National Center for Atmospheric Research, the St Vrain School District in Colorado, Qualcomm, and Mobile Geophysical Technologies in Germany.

Olivier is also the author of a higher education course on fundamentals of drone engineering, and is a member of the Ardupilot development team, the ubiquitous open source flight controller under the hood of a majority of professional fixed wings, helicopters, and multirotors UAVs. He holds Bachelor’s degrees in Mathematics and Physics, received his M.S. and Ph.D. degrees in Computer Science from the University of Colorado, Boulder, and lives next to an eclectic fleet of over 25 UAVs.

## Michael Ann Lane

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Global Education Manager, Hexagon Geospatial, CO



Michael Ann (Mike) Lane has been with Hexagon Geospatial for over 17 years. She has held several positions within the organization including Quality Assurance Engineer and Customer Education Specialist in the U.S., has worked in Pre-sales,

Support and Training for Europe, Middle East and Africa, and then was the Customer Pre-sales and Support Manager for Australia. Mike has returned to the U.S. and is now the Global Education Manager. Her role includes Product management to ensure the Education packages are in line with industry standards and academic interests. She organizes grants and implements partnerships with other organizations to diversify the education customer base and extend Hexagon Geospatial's technology. She provides technical hands-on training workshops for all Education packages, including the new cloud-based app building platform, Hexagon Smart M.Apps. She attends education conferences, presents education success stories, and guest lectures at universities on a variety of topics. She also coordinates curriculum creation and distribution to facilitate teaching Hexagon Geospatial software solutions in academia. Mike has a B.S. in Geography from Northwest Missouri State University in the U.S. and specializes in ERDAS Desktop remote sensing and photogrammetric software.

## Dr. Javier Leon

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Senior Lecturer in Physical Geography and Environmental Science Program Coordinator, School of Science and Engineering, University of the Sunshine Coast, Australia



Dr Javier Leon is a geographer with broad interests in geomorphology and is particularly interested in the study and management of coastal systems including sandy beaches and coral reefs. He has developed and collaborated in multidisciplinary research projects

combining field data, geospatial techniques and modelling in study sites across the Great Barrier Reef and Eastern coast of Australia and Pacific Islands including Papua New Guinea and Solomon Islands. His aim is to answer questions related to links between morphology, ecology and management in the current changing climate and sea-level rise context.

## Terry Ryan

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Federal Sales Manager, LizardTech, CO



Terry Ryan has been the Federal Sales Manager for LizardTech for 13+ years and is responsible for the sales and distribution of LizardTech's suite of software products used for managing, distributing and accessing large complex digital

content, mainly including aerial imagery, satellite imagery, and LiDAR data. Mr. Ryan has a long history working in sales, marketing and channel development for the geospatial and remote sensing industries. Before joining LizardTech, Terry worked

for IntraSearch-MapMart as Director of Sales, providing remote sensing data, GIS base data, and GIS software to commercial and government users. Prior to that, he held the position of Sales Manager for Land Info International and provided GIS data and services to users across the globe. Mr. Ryan has also held other sales & marketing related positions in the geospatial marketplace, including; Business Development Manager for Hitachi Software Global Technology, being responsible for development of partnerships with leading satellite imagery and aerial photography organizations around the US. Terry graduated in 1993 with a BA degree in marketing & advertising from Loras College in Dubuque, Iowa. He is a member of ASPRS, GIS Colorado, AUVSI and USGIF professional organizations. He is a former President and current National Director of the ASPRS Rocky Mountain Region and also continues involvement with UAS Colorado as a local member.

## Jeffrey M. Young

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Global Business Development, LizardTech, CO



Geographer Jeffrey M. Young was born near the physiographic boundary of the Endless, Moosic and Pocono Mountains 3.2 kilometers northeast of the confluence of Roaring Brook and the Lackawanna River in Scranton, Pennsylvania.

Currently at LizardTech, over the last nine years Jeff has been responsible for expanding third party relationships and he represents LizardTech at ASPRS, The Open Geospatial Consortium, UAS initiatives in Colorado, and serves as a Friend of the Geospatial Data Acquisition Technologies AFB80 Committee for the Transportation Research Board. Prior to joining LizardTech he held positions in program

management, business development, consulting, and sales with several geospatial companies, including Leica Geosystems, Space Imaging, and Bentley Systems. Jeff earned a B.S. in Geography (cum laude) from Lock Haven State College in Pennsylvania and a National Science Foundation funded M.A. in Geography, specializing in land use analysis and environmental hazards, from Arizona State University (ASU). His master's thesis is titled *Land Use Management in Geological Hazard Areas: Durango East Quadrangle Colorado*. Interest in research remains with most current studies related to hazardous mountain environments, Pueblo communities in New Mexico, geospatial data archiving and preservation, close-up photogrammetry and toponymy. Jeff and his wife Pamela of 28 years live in Centennial, Colorado with their mid 20's daughter and son living nearby. Jeff enjoys deep sea fishing, biking, golf when time allows and traveling with his family.

## Jeremiah Lindemann

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Solutions Engineer/Geographer, Esri, CO



Jeremiah Lindemann is a solution engineer from Esri assisting local governments with ArcGIS. He has been with Esri for 17 years and is a proud University of Wyoming graduate from the geography department. Daily he assists with a variety of uses of GIS from Public

Works, Assessors Offices, Law Enforcement to Health. There continues to be a growing interest in many of these areas for drones and acquiring new imagery. Jeremiah will give a brief overview of how the results from Drones can be used with ArcGIS.

## Bill Moudy

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Unmanned Aerial Systems Specialist, Owlsight, Inc., CO



Bill Moudy is an Unmanned Aerial Systems specialist of Fort Collins, Colorado. With over 20 years experience using Multirotors and Fixed wing aircraft, Bill has im-

plored the use of Bathymetric LiDar, HD video, sonar, Emissive IR and temperature sensing equipment, etc. These systems are generally used in conjunction with GPS and GIS systems to produce topographic maps for post-production analyses.

When an off the shelf system will not produce results, Bill's company Owlsight (a division of Fort Collins Aerial Imagery) can build a fixed wing or Multirotor platform to acquire the data necessary to meet your company's needs. Visit [www.owlsight-fcai.com](http://www.owlsight-fcai.com)

## Alan Telck

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CEO & Founder, AgTerra Technologies, Inc., WY



Alan is the founder and CEO of AgTerra Technologies, Inc. in Sheridan, Wyoming. His education and early career background in natural resource management, environmental chemistry, crop consulting and GIS, plus a deep love of the outdoors

and all things technical, kindled a desire to bring easy-to-use technology to all outdoor workers. Even in the 90's, when the world wide web sounded like spiders were taking over, "the cloud"

produced rain, and even an inaccurate GPS couldn't fit in a pocket, Alan was spatially analyzing remote imagery and electronically delivering maps and reports to agriculturists and farmers. Today, AgTerra's product offerings include proprietary dataloggers working in combination with the company's own mobile and web-based mapping and recordkeeping systems. The company's powerful and innovative products and services enable outdoor professionals in multiple industries, from individuals to small and large companies across America and overseas, to easily map, collect, and manage data. When not in the office, or handling emergencies as a volunteer firefighter, Alan is likely exploring the endless open spaces of Wyoming, where wildlife and amazing geology and scenery never fail to provide adventure. And yes, AgTerra's products work wonderfully well serving these selfish interests as well!

## Brian Lee

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Research Scientist, Wyoming Agricultural Experiment Station, WY



Brian Lee is a Research Scientist in the Agricultural and Applied Economics Department. Lee is stationed at the Sustainable Agriculture Research and Extension Center (SAREC) in Lingle Wyoming. The SAREC Research Station is attempting

to integrate UAV technology into their crop research. SAREC is also working with Eastern Wyoming College in their development of a Precision Agriculture program.

## Jeff Sloan

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Project Leader, USGS National Unmanned Aircraft Systems Project Office, CO



Jeff Sloan holds a Bachelor of Science Degree in Geography from the University of Northern Iowa (1981-85) and continued graduate work in Geographic Information Systems at the University of Denver in Denver, Colorado (1991-

92). He has worked as a Cartographer in the U.S. Federal Government for 33 years beginning with the U.S. Dept. of Defense - Defense Mapping Agency, with U.S. Dept. of Homeland Security - Operations Center and the Customs and Border Protection in Washington D.C, and a majority of his career with the Dept. of the Interior – USGS in Denver, Colorado.

His background is primarily in the areas of cartography, photogrammetry, and remote sensing pertaining to domestic and international mapping and monitoring. He has been involved with UAS operations since 2008 and in 2014, he took over as the Project Leader for the USGS National Unmanned Aircraft Systems Project Office in Lakewood, Colorado.

## Justin Fischer

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Geographer, USDA APHIS National Wildlife Research Center (NWRC), CO



Justin Fischer is a Geographer for USDA APHIS National Wildlife Research Center (NWRC) whose current research interests focus on understanding the spatial ecology of various wildlife species, disease epidemiology, move-

ment analysis, home range estimation, and

Unmanned Aircraft Systems (UAS). As a NWRC researcher, his scholarly interests have encompassed a range of topics, including habitat and resource selection modelling, various wildlife species quantitative movement analysis, landcover mapping, rabies and chronic wasting disease epidemiology, nonlethal damage management technique testing, and wildlife damage sampling estimation. Mr. Fischer also serves as a NWRC-wide GIS and UAS resource. He develops databases, maps, and other products for a variety of purposes.

## Dr. Jana Müllerova

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Deputy Head of the Department of GIS and Remote Sensing, Institute of Botany, Czech Academy of Sciences, Pruhonice, Czech Republic



Jana Müllerova is a plant ecologist from Institute of Botany, the Czech Academy of Sciences, Czech Republic, currently at University of Colorado, INSTAAR, Boulder as a Fulbright Visiting Scholar. In her research, she focuses on remote sensing (satellite, air-

borne and UAS), GIS, and modeling approaches in plant ecology and landscape studies with a special interest in invasive alien plant species, plant-environment and plant-human interactions, current & historical disturbances at both community and landscape level, and spatio-temporal changes of vegetation

## Dr. Huihui Zhang

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Research Physical Scientist, Water Management & Systems Research Unit (WMSRU), USDA-Agricultural Research Service, CO



Dr. Huihui Zhang received her Ph.D. degree in Biological and Agricultural Engineering from Texas A&M University. She is currently a Research Physical Scientist in the Water Management and Systems Research Unit (WMSRU),

USDA-Agricultural Research Service, Fort Collins, Colorado. Her research program at the WMSRU focuses on developing methods for agricultural water management, limited irrigation management, estimation of crop water status and crop water use, and improving crop water productivity using remote sensing technologies. She is author or co-author of several refereed papers which have been published in journals such as *Agricultural Water Management*, *Transactions of the ASABE*, *Field Crops Research*, *Computers and Electronics in Agriculture*, and *Biosystems Engineering*. She is an Associate Editor for *International Journal of Agricultural and Biological Engineering* and *MDPI Agronomy*, and is an associate faculty member in Civil and Environmental Engineering at Colorado State University. Her current work involves the integration of infrared thermometry sensors and ground-based remotely sensed spectral data for plant and soil water monitoring with deficit irrigation management. Her expertise also includes UAV, airborne, and satellite-based remote sensing techniques for assessing crop water use and ET modeling.

## Robert Houchell

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FAA-Certified Drone Pilot, Just Drone It, CO



Robert Houchell has over 30 years of experience flying helicopters, and now drones. He is an FAA licensed & certified drone pilot with thousands of hours in the air.

Just Drone It drones carry a 4k camera that takes aerial imagery up to 400 feet aloft

with flight times up to 30 minutes. They capture sweeping views and the company is able to document progress for construction projects, provide due diligence for the real estate market and capture high-quality aerial imagery for many types of businesses.

## Dr. Gregory Cruetsinger

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Founder, Scholar Farms, CA



Dr. Greg Cruetsinger is the founder of Scholar Farms, which specializes in using multi-spectral cameras & drones for vegetation mapping. The company was founded from extensive experience in academic research and teaching, as well as the

commercial drone industry. Prior to Scholar Farms, Greg was the Sales Director for the scientific and academic verticals at Pix4D and Parrot, and the Academic Programs Director at 3D Robotics. While serving academia, Greg was an Assistant Professor of Ecology at the University of British Columbia. Greg received his PhD in Ecology and Evolutionary Biology from the Univ. of Tennessee-Knoxville, and was named Miller Postdoctoral Fellow of Ecology and Evolutionary Biology at the Univ. of California, Berkeley.

## Elizabeth Traver

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SSHL Manager, EPSCoR-IDEA, University of Wyoming, WY



Elizabeth has been the Surface and Sub-surface Hydrology Lab manager for the EPSCoR WyCEHG project for the last 5+ years. She has a MS in Botany from the University of Wyoming (UW) and is currently pursuing a PhD in Soil Science

and Ecology (also at UW). Outside of the University, Traver teaches skiing and snowboarding, and generally loves being outside to bike, hike, run or ski.

## Shannon Helvie

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FAA-Licensed Drone Pilot , EagleiMedia LLC, CO



Shannon Helvie is a videographer/photographer and FAA-licensed drone pilot.

Before founding EagleiMedia LLC, Shannon worked in film and graphic design while homeschooling her three children for 14 years. Based on that experience, Shannon

decided to open a business targeted to the things she loves. To that end, she sets the stage for businesses and families interested in telling their unique stories in a new way.

EagleiMedia LLC focuses on video production, photography and drone imagery. And, Shannon's a "Jane-of-all-Trades" from promotional to commercial and interviewing to training. In short, she provides smart, creative solutions for businesses both large and small.

Shannon recently passed the FAA drone certification exam and earned her black belt in both American Kenpo and Kyokushin karate -- So don't mess with her!

She enjoys martial arts, fishing, camping and spending time with her husband and three children.

## Chris Leatherman

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Wyoming Ambassador and Certified FAA Drone Pilot, Aerial Solutions of Wyoming, WY



Chris Leatherman is the owner of Aerial Solutions of Wyoming. He has years of experience flying drones and is an FAA certified remote pilot. He is also an adjunct instructor in GIS and drone studies for the University of Denver. Chris helps students

find their niche in the GIS/drone world, teaches photogrammetry, and leads a drone flight school through the University.

## Sam Cox

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Natural Resource Specialist, USDI Bureau of Land Management, WY



Sam Cox is a Remote Sensing Specialist with the USDI Bureau of Land Management in the Wyoming State Office located in Cheyenne. He utilizes stereo imagery from UAS and terrestrial platforms for multidisciplinary photogram-

metric projects as part of the BLM's multiple-use land-management mandate. Cox is a co-developer of SamplePoint, free software for manual image analysis that is used in over 80 countries by

universities, local governments and federal agencies. Cox is a graduate of Colorado State University.

Previous career experience includes:

- Remote Sensing Technician, USDA Agricultural Research Service, Cheyenne, WY
- Fire Effects Technician, USDI National Park Service, Dinosaur National Monument, CO

## David Keto

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Media Producer, University of Wyoming Extension, WY



David Keto is a Media Producer for University of Wyoming Extension. As a member of the Extension Communications & Technology Office, David helps Extension Educators and Specialists create videos to deliver their educational

programming to a broader audience. He helps with all aspects of video production from planning to editing and also supports Extension personnel with training in DIY video production techniques. David first began flying UAVs in 2013 after seeing the opportunity they offered to enhance video storytelling. He has plenty of experience with manual flight using a Phantom 1 and learned the hard way that quality video for storytelling isn't as simple as the finished product makes it look.

## Kyle Spradley

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Photographer/Videographer, Institutional Marketing, University of Wyoming, WY



Kyle Spradley is a landscape and nature photographer that also specializes in sports, photojournalism and video production. He is a FAA-Certified drone pilot and works for the University of Wyoming's Institutional Marketing Department as a

Photographer/Videographer. Kyle graduated with a degree in Agricultural Journalism from the University of Missouri and also owns a photography/video production company. Visit [www.kspradleyphoto.com](http://www.kspradleyphoto.com) to see more of his work.



# POSTER PRESENTATIONS

Please visit the following poster presenters between 4:00 PM and 5:30 PM on Wednesday, May 30<sup>th</sup>:

## **Plant water-use from the sky: Solar induced chlorophyll fluorescence with multispectral imaging from UAV increasing spatial and temporal throughput of drought stress**

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**Daniel Beverly**, University of Wyoming, WY

## **Mapping Ghost Crab Burrows**

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**Rachel Bycroft**, University of the Sunshine Coast, Queensland, Australia

## **Effect of ground control points on photogrammetric surface spatial accuracy**

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**Sam Cox**, Natural Resource Department, U.S. Department of Interior (USDOI)/Bureau of Land Management (BLM), WY

## **UAV Mapping possibilities for agricultural research**

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**Brian Lee**, Wyoming Agriculture Experiment Station, WY

## **Aerial Survey of exotic tropical plants in Selby Botanical Gardens**

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**Matthew Lehmitz** and **Gregory Brown**, University of Wyoming, WY, and **Elizabeth Gandy**, Marie Selby Botanical Gardens, Sarasota, FL

## **In the Weeds: Lessons Learned in the Remote Sensing of Invasive Plants with UAVs**

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**Chloe Mattilio**, University of Wyoming, WY

## **Estimating nearshore bathymetry using drone-derived video**

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**Ashley Rummell**, University of the Sunshine Coast, Queensland, Australia

## **Lessons learned from imaging targets on top of tree canopies**

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**Sajith Variyar, V.V.**, **Sowmya, V.**, **Gopalakrishnan, E.A.**, and **Soman K.P.**, Amrita Vishwa Vidyapeetham, Coimbatore, India; **Ramesh Sivanpillai** and **Gregory Brown**, University of Wyoming, WY

## **A quantitative rating system for imagery acquired with unmanned aerial vehicle**

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**Elizabeth Wirsching**, **Ramesh Sivanpillai**, and **Gregory Brown**, University of Wyoming, WY





