



## Optical Science & Engineering Conference

Ballrooms B & C – Strand Union Building  
Montana State University  
Bozeman, Montana

Presented by the MSU Optical Technology Center (OpTeC), with support from the MSU Vice-President for Research and Economic Development, the City of Bozeman, and the Montana Photonics Industry Alliance.



### Conference Agenda Tuesday, 4 October 2016

Conference Organizers:

Dr. Joseph Shaw – OpTeC Director  
Dr. Larry Johnson – Montana Photonics Industry Alliance President  
Diane Harn – Conference Coordinator

8:00 am **CHECK-IN and MORNING REFRESHMENTS**

8:25 am Joseph Shaw – OpTeC Director, MSU  
*Welcome and opening remarks*

Session 1

Session chair: Joseph Shaw

8:30 am John Stover – Invited Speaker  
Owner, The Scatterworks – Tucson, Arizona  
*Three new things in light scatter: A challenge, a new tool, and a surprise*

9:10 am David P. Atherton,<sup>1</sup> John Singleton,<sup>2</sup> Zeb Barber,<sup>1</sup> Charles Thiel,<sup>1</sup> Wm. Randall Babbitt<sup>2</sup>  
<sup>1</sup> MSU Spectrum Lab; <sup>2</sup> MSU Physics Department  
*Ultra-sensitive accelerometry with laser trapped and cooled rare earth doped particles*

9:30 am Tianbo Liu and David Dickensheets  
MSU Electrical and Computer Engineering Department  
*3-dimensional beam scanner for a handheld confocal dermoscope*

9:50 am David Skowron, Jacob Remington, Yuyuan Zhang, Ashley Beckstead, and Bern Kohler  
MSU Chemistry and Biochemistry Department  
*Time-resolved fluorescence of model DNA oligonucleotides*

10:10 am **BREAK & REFRESHMENTS**

Session 2

Session chair: Rufus Cone

- 10:35 am Eric S. Massaro, Andrew H. Hill, Casey L. Kennedy, Erik M. Grumstrup  
MSU Chemistry and Biochemistry Department  
*Sub-diffraction-limited pump-probe spectroscopy*
- 10:55 am Alexander Mikhaylov, Jake R. Lindquist, Patrik R. Callis, Juri Pahapill, Sophie de Reguardati, Matt Rammo, Merle Uudsemaa, Aleksander Trummal, Aleksander Rebane  
MSU Physics Department  
*Femtosecond two-photon absorption spectra and permanent electric dipole moment change of tryptophan, 2-aminopurine and related intrinsic and synthetic fluorophores*
- 11:15 am Charles Kankelborg  
MSU Physics Department  
*300 seconds above 160 kilometers: Remote sensing of the sun with a slitless imaging spectrograph*
- 11:35 am Benjamin Moon, Carol Baumbauer, Andrew Hohne, Ethan Keeler, Marquette Stevenson, David L. Dickensheets, and Wataru Nakagawa  
MSU Electrical and Computer Engineering Department  
*Amplitude and phase-resolved characterization of nanostructured reflective quarter-wave plates for the infrared*

11:55 am **Lunch** on your own

Session 3

Session chair: Erik Grumstrup

- 1:30 pm Andrew Hill, Eric Massaro, Casey Kennedy, Erik Grumstrup  
MSU Chemistry and Biochemistry Department (Materials Science Program)  
*Ultrafast microscopy of methylammonium lead iodide perovskites*
- 1:50 pm Seth Laurie, Paul W. Nugent, and Joseph A. Shaw  
MSU Electrical and Computer Engineering Department  
*Imaging for mapping weeds during harvest*
- 2:10 pm Cooper McCann,<sup>1</sup> Kevin S. Repasky,<sup>1</sup> Mikindra Morin,<sup>2</sup> Rick Lawrence,<sup>2</sup> and Scott Powell<sup>2</sup>  
MSU Electrical and Computer Engineering Department  
MSU Land Resources and Environmental Sciences Department  
*Hyperspectral processing: Using Landsat surface reflectance data as a calibration target for multi-swath hyperspectral data and a novel histogram based unsupervised classification technique using biophysically relevant fit parameters*
- 2:30 pm Trent Berg  
Program Director, Photonics Technician Program, Gallatin College  
*The new Photonics Technician program at Gallatin College*

2:50 pm        **BREAK & REFRESHMENTS**

Session 4 Commercialization of Optics & Photonics Technology Co-chairs: Joe Shaw & Larry Johnson

- 3:20 pm        Larry Johnson  
President, Montana Photonics Industry Alliance  
*Montana Photonics Industry Alliance*
- 3:30 pm        Pete Roos  
President and CEO, Bridger Photonics  
*Next-generation LiDAR – From kilometers to nanometers*
- 3:50 pm        Michael Barrett  
Regional Sales Manager, Quantel USA  
*Quantel pulsed nanosecond Nd:Yag lasers for remote sensing*
- 4:10 pm        Jim Curry, Vice President of Engineering, Blackmore Sensors & Analytics  
*Long-range high-resolution FMCW lidar for security and surveillance applications*
- 4:30 pm        Ben Keeley  
Technical Sales Engineer, Ascent Vision  
*Ascent Vision and the growing market for gyro-stabilized gimbal systems*
- 4:50 pm        Poster setup and room configuration change
- 5:30 pm        Hors d'oeuvres
- 5:45 pm        MPIA news and announcements – Larry Johnson

Session 5 – Poster Session and MPIA Social

---

- 6:00 pm        Welcome to evening session – Joseph Shaw
- 6:10 pm        Presentation of the 2016 Montana Optics Innovator Award to John Stover  
*For innovation in optical scatter technology and leadership in establishing and growing TMA Technologies, one of the Gallatin Valley's first optical technology companies*

*Company exhibits*

**AdvR, Inc.**

**Ascent Vision**

**Gentec-USA**

**Montana Instruments**

**Resonon, Inc.**

**Big Sky Western Bank**

**Altos Photonics**

**FLIR/Scientific Materials Corp.**

**Lattice Materials**

**Quantel USA**

**S2 Corp.**

## Posters

1. Cal Harrington, Krishna Rupavatharam, and Jason Dahl  
MSU Spectrum Lab  
*Photonic down converting link for S2-based RF signals processing, queueing receiver*
2. David P. Atherton,<sup>1</sup> John Singleton,<sup>2</sup> Zeb Barber,<sup>1</sup> Charles Thiel,<sup>1,2</sup> and Wm. Randall Babbitt<sup>2</sup>  
<sup>1</sup> MSU Spectrum Lab  
<sup>2</sup> MSU Physics Department  
*Laser trapping and cooling of dielectric particles*
3. Tia Sharpe and Zeb Barber  
MSU Spectrum Lab  
*Nondestructive characterization of optical waveguides*
4. Caleb Stoltzfus, Zeb Barber, David Atherton, and Russel Barbour  
<sup>1</sup> MSU Spectrum Lab  
<sup>2</sup> Advanced Microcavity Sensors  
*Liquid crystal arrayed microcavity (LCAM)*
5. Ryan Galloway and Zeb Barber  
MSU Spectrum Lab  
Time of flight 3D imaging
6. Shane Atwood and Charles Kankelborg  
MSU Physics Department  
*A PSF equalization technique for the multi-order solar extreme ultraviolet spectrograph (MOSES)*
7. Roy Smart, Hans Courier, and Charles Kankelborg  
MSU Physics Department  
*Preliminary results of the MOSES II 2015 flight*
8. Casey L. Kennedy, Andrew H. Hill, Eric S. Massaro, and Erik Grumstrup  
MSU Chemistry and Biochemistry  
*Charge carrier dynamics in CsPbBr<sub>2</sub> perovskites*
9. Jake R. Lindquist, Alexandr Mikhailov, and Aleks Rebane  
MSU Physics Department  
*Automated system for characterization of ultra-short pulse duration over a broad wavelength range*
10. James Dilts, Jacob Fleming, Ben Moon, Kolby McGarrah, Tristan Gray, and Wataru Nakagawa  
MSU ECE Department  
*Pressure sensing using nano-structured deformable optical waveguides*

11. Bryan Scherrer,<sup>1</sup> Andrew Donelick,<sup>1</sup> Paul W. Nugent,<sup>1</sup> Prashant Jha,<sup>2</sup> and Joseph A. Shaw<sup>1</sup>  
<sup>1</sup>MSU ECE Department  
<sup>2</sup>Southern Agricultural Experiment Station, Montana State University, Huntley, MT  
*Discrimination of herbicide-resistant weeds with hyperspectral imaging*
12. C. W. Thiel, A. Marsh, P. J. T. Woodburn, and R. L. Cone  
MSU Physics Department  
*MREDI: Active waveguides and integrated optical circuits for photonics devices*
13. A. Marsh, P. J. T. Woodburn, and R. L. Cone  
MSU Physics Department  
*Theoretical modeling of dielectric strip-loaded waveguides*
14. P. J. T. Woodburn, C. W. Thiel, and R. L. Cone  
MSU Physics Department  
*Characterizing and designing rare earth activated materials for photonic application*
15. K. Olson, A. Marsh, P. J. T. Woodburn, C. W. Thiel, and R. L. Cone  
MSU Physics Department  
*Rare-earth doped waveguide development and characterization*
16. Conner Dack, Sam Kysar, Monica Whitaker, and Ross Snider  
MSU ECE Department  
*Hyperspectral waterfall sorting*
17. Aislinn Daniels, Torrey McLoughlin, Ryan Galloway, and William R. Babbitt  
MSU Physics Department  
*Testing vibrationally induced coherence loss in closed-cycle cryostats*
18. Elizabeth Corbin, Ninio Xie, Renee Reijo Pera, Robert Usselman, and Edward Dratz  
MSU Chemistry and Biochemistry Department  
*Hyperspectral Imaging Microscope for Optimization of Stem Cell Metabolic State with Microfluidic Nutrient Control*

**We express great appreciation to the following external sponsors of this conference:**

**City of Bozeman**

**Montana Photonics Industry Alliance (MPIA)**