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,1 John Singleton,2 Zeb Barber,1 Charles Thiel,1 Wm. Randall Babbitt2
1 MSU Spectrum Lab; 2 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,1 Kevin S. Repasky,1 Mikindra Morin,2 Rick Lawrence,2 and Scott Powell1  
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.  
- Altos Photonics  
- Ascent Vision  
- FLIR/Scientific Materials Corp.  
- Gentec-USA  
- Lattice Materials  
- Montana Instruments  
- Quantel USA  
- Resonon, Inc.  
- S2 Corp.  
- Big Sky Western Bank
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,¹ John Singleton,² Zeb Barber,¹ Charles Thiel,¹,² and Wm. Randall Babbitt²
   ¹ MSU Spectrum Lab
   ² 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
   ¹ MSU Spectrum Lab
   ² 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 Courrier, 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 CsPbBrI2 perovskites*

   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,1 Andrew Donelick,2 Paul W. Nugent,1 Prashant Jha,2 and Joseph A. Shaw1
1 MSU ECE Department
2 Southern Agricultural Experiment Station, Montana State University, Huntley, MT
*Discrimination of herbicide-resistant weeds with hyperspectral imaging*

MSU Physics Department
*MREDI: Active waveguides and integrated optical circuits for photonics devices*

MSU Physics Department
*Theoretical modeling of dielectric strip-loaded waveguides*

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)