



Optical Science & Engineering Conference

Ballroom A – 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 and the City of Bozeman, and in cooperation with the Montana Photonics Industry Alliance.



Conference Agenda Monday, September 25, 2017

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**

8:30 am Joseph Shaw
MSU Optical Technology Center Director
Welcoming comments

Session 1 Technical talks Session chair: Rufus Cone

8:40 am Louis Oberto and Zeb Barber
MSU Spectrum Lab
Nonlinear Recovery for Spectral Hole-burning Readout

9:00 am Casey L. Kennedy¹, Andrew H. Hill², Eric S. Massaro¹, Erik M. Grumstrup^{1,2}
¹MSU Chemistry & Biochemistry Department
²MSU Materials Science Program
Ultrafast Excited State Transport and Decay Dynamics in Cesium Lead Mixed-Halide Perovskites.

9:20 am Charles Kankelborg¹, Philip Judge², Amy Winebarger³, Ken Kobayashi³, Laurel Rachmeier³, Roy Smart¹
¹MSU Physics Department

²High Altitude Observatory/National Center for Atmospheric Research

³NASA Marshall Space Flight Center

The FURST Mission: VUV Spectroscopy of the Sun as a Star

9:40 am Thomas Rust and Charles Kankelborg
MSU Physics Department
Simultaneous Imaging and Spectroscopy of the Extreme Ultraviolet Sun with the MOSES Sounding Rocket

10:00 am **BREAK & REFRESHMENTS**

Session 2 Technical talks Session chair: Randy Babbitt

10:30 am Ioannis Roudas¹ and Jaroslaw Kwapisz²
¹MSU Electrical and Computer Engineering Department
²MSU Mathematical Sciences Department
Modal dispersion characterization of multimode fibers

10:50 am Laura M. Dahl, Martin Jan Tauc, and Joseph A. Shaw
MSU Electrical and Computer Engineering Department
Measuring cloud thermodynamic phase with all-sky polarization imaging

11:10 am Joseph Shaw, Rufus Cone, Charles Thiel, Kevin Repasky, Zeb Barber, Rob Walker, Ross Snider, Ed Dratz
¹MSU Optical Technology Center
²MSU Electrical and Computer Engineering Department
³MSU Physics Department
⁴MSU Chemistry and Biochemistry Department
Summary of accomplishments from the Montana Research and Economic Development Initiative (MREDI)

11:50 am **Lunch** on your own

Session 3 Session chair: Rob Walker

1:20 pm Ryan Galloway¹, Zeb Barber¹, Dave Rabb², Jason Stafford²
¹MSU Spectrum Lab
²Air Force Research Lab, Laser Radar Branch
Self-Referencing Lidar

1:40 pm Christine Gobrogge and Robert Walker
MSU Chemistry and Biochemistry Department
Using Time-Resolved Fluorescence Emission to Investigate Solute Partitioning in Phospholipid Membranes

- 2:00 pm Martin Jan Tauc¹, Kurt M. Frstrup², and Joseph A. Shaw¹
¹MSU Electrical and Computer Engineering Department
²Natural Sounds and Night Skies Division, National Park Service, Fort Collins, CO
Wing-beat-modulation scanning lidar for insect studies
- 2:20 pm Bradley R. Slezak, Charles W. Lewandowski, and Brian D'Urso
 MSU Physics Department
Measurement on a Particle in a Magneto-Gravitational Trap

2:40 pm Break

Session 4 Commercialization of Optics & Photonics Technology Session Chair: Larry Johnson

3:00 pm Larry Johnson
Montana Photonics Industry Alliance

3:10 pm Trevor Huffmaster
406 Labs Accelerator

3:30 pm Chris Arrasmith
Revibro Optics

3:50 pm Zachary Cole
FLIR Scientific Materials Corp.

4:10 pm Joe Sawyer
Quantel USA

4:30 pm Room transition

5:10 pm Hors d'oeuvres & poster setup

6:00 – 8:00 pm **POSTER SESSION & Hors d'oeuvres**

6:00 pm Welcome to Evening Session & presentation of the 2017 Montana Optics Innovator Award to Steve Birrell: *for pioneering work in the test and measurement market place with the design and production of laser systems and precision pulse generator instrumentation products.*

Session 5 – Poster Session

Company exhibits

AdvR, Inc
FLIR/Scientific Materials Corp.
Ophir-Spirocon
Resonon, Inc

Altos Photonics
Montana Instruments
Quantel, USA
Zygo/AMTEK Ultra Precision Technologies

Research Posters

1. Andrew H. Hill¹, Casey L. Kennedy², Saranyan Ragunath², Alexander Hathaway², and Erik M. Grumstrup^{1,2}
¹ MSU Chemistry and Biochemistry Department
² MSU Material Science Program
Direct Determination of Perovskite Carrier Scattering Times Using Pump-Probe Microscopy
2. Eric Massaro¹, Andrew Hill², Casey Kennedy¹, and Erik Grumstrup^{1,2}
¹ MSU Department of Chemistry and Biochemistry, Montana State University, Bozeman, Montana 59717, United States ² Montana Materials Science Program, Montana State University, Bozeman, Montana 59717, United States
Diffraction Limited Ultrafast Spectroscopy Sheds Light on Unprecedented Exciton Diffusion in PCDTBT Thin Films
3. Robert W. Hutchinson¹, Norbert Jakubowski², Heike Traube², Diego Esteban-Fernandez², Jay Wilkins³, Leif Summerfield³, Ciaran O'Connor³, Katherine McLachlin³
¹Electro Scientific Industries, Ltd. – Huntingdon, UK
²BAM – Berlin, Germany
³Electro Scientific Industries, Inc. – Bozeman, MT
The NWR IMAGE-an Elemental Microscope
4. Aislinn Daniels¹ and Wm. Randall Babbitt²
MSU Physics Department
Characterizing Vibration-Induced Coherence Loss in a Closed-Cycle Cryostat
5. Demi St. John, David P. Atherton, Charles Thiel, Zeb Barber, and Wm. Randall Babbitt
MSU Physics Department and Spectrum Lab
Solid-State Laser Cooling and Functionalization of Optically Levitated Particles
6. Eric Mitchell¹, Esther Baumann², Matthew Hoehler², and Zeb Barber¹
¹MSU Spectrum Lab
²National Institute of Standards and Technology
Multi-wavelength coherent lidar through fire
7. Kora Barnes, Elizabeth Corbin, Robert Usselman, Renee Reijo-Pera, Rand Swanson, Ross Snider, and Edward Dratz
MSU Chemistry and Biochemistry Department
Developing hyperspectral imaging, optogenetics, and high-performance image processing for monitoring metabolic states of live cells in culture
8. Benjamin Gold, Josh Sinrud, and Robert A. Walker
MSU Department of Chemistry and Biochemistry
High Temperature Optical Studies of Nickel Aluminate as a Catalyst and Anti-sintering Agent in Energy Conversion Technologies

9. Tristan Gray, Jacob Fleming, James Dilts, Benjamin Moon, and Wataru Nakagawa
MSU Department of Electrical and Computer Engineering
Optical Pressure Sensing Using Deformable Waveguides
10. Dario Scotto and Alan Craig
MSU Physics Department
Novel Quadrupole RF Ring Trapping and Cooling of Electrons via Sympathetic Cooling with a Magneto-optically Trapped Atomic Buffer
11. Katie Link and Robert A. Walker
MSU Chemistry & Biochemistry Department
Cooperative Adsorption in Model Sea Spray Aerosols with Vibrational Sum Frequency Generation
12. Torrey McLoughlin¹, Carol Baumbauer², Wm. Randall Babbitt¹, Wataru Nakagawa², Phil Himmer³, Dustin Blagg⁴, and Ioannis Roudas²
¹MSU Physics Department
²MSU Electrical and Computer Engineering Department
³MSU Montana Microfabrication Facility
⁴Chemical & Biological Engineering
Nanoscale grating electrodes for nonlinear optics applications
13. Connor Beck¹, Clark Hickman^{1,2} and Anja Kunze¹
¹MSU Electrical and Computer Engineering Department
²Gustavus Adolphus College
Prototyping a portable incubator-fluorescent imaging system
14. R. Nerem, A. Marsh, P. J. T. Woodburn, C. W. Thiel, and R. L. Cone
MSU Physics Department
Scanning Fabry-Perot Interferometers for High-resolution Laser Systems
15. A. Marsh, C. Richard, P. J. T. Woodburn, K. Olson, C. W. Thiel, and R. L. Cone
MSU Physics Department
Characterization of Tm:YAG Waveguides for Optical and Quantum Signal Processing Applications
16. Laura M. Dahl¹, Martin Jan Tauc¹, Taiga Hashimoto², Preston Hooser¹, Kendra Gillis³, William Weiss³, Bryan Stanley⁴, and Joseph A. Shaw¹
¹MSU Electrical and Computer Engineering Department
²Hokkaido University, Japan – Applied Physics Department
³BYU Idaho Physics Department
⁴Colorado State University Physics Department
Skylight polarization measurements at the 2017 solar eclipse: preparations and preliminary results
17. Ryan Galloway¹, Zeb Barber¹, Dave Rabb², Jason Stafford²
¹MSU Spectrum Lab
²Air Force Research Lab, Laser Radar Branch
Self-Referencing Lidar

18. Eric S. Massaro, Andrew H. Hill, and Erik M. Grumstrup
Department of Chemistry & Biochemistry
& Department of Material Science
Montana State University
Label-Free Sub-Diffraction Limited Imaging