Optical Science & Engineering Conference Agenda

Wednesday, August 7, 2019
Inspiration Hall, Norm Asbjornson Hall
(Enter via room 301 during the day and room 201 in the evening)
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, the Montana Photonics Industry Alliance, and our corporate sponsor, OptoSigma Corporation.

Conference Organizers:
Dr. Joseph Shaw – OpTeC Director
Diane Harn – Conference Coordinator

8:00 am  CHECK-IN and MORNING REFRESHMENTS

8:15 am  Joseph Shaw
MSU Optical Technology Center Director
Welcoming comments

Session 1  Session chair: Erik Grumstrup

8:20 am  Kevin Repasky
Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT
Micro-pulse differential absorption lidar for thermodynamic profiling of the lower troposphere

8:40 am  Martin Jan Tauc, Elizabeth M. Rehbein, Laura M. Eshelman, and Joseph A. Shaw
Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT
Polarization enhancement of passive SWIR cloud thermodynamic phase remote sensing

9:00 am  Bryan J. Scherrer,¹ John Sheppard,² Prashant Jha,³ and Joseph A. Shaw¹
¹Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT
²Gianforte School of Computing, Montana State University, Bozeman, MT
³Southern Agricultural Research Center, Montana State University, Huntley, MT
Discriminating herbicide-resistant weeds using hyperspectral imaging and machine learning
9:20 am  Erica Venkatesulu, Jordan Baker, Riley Logan, Bryan Scherrer, and Joseph A. Shaw
Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT
*Airborne hyperspectral imaging of inland waterways*

9:40 am  Jay Kumler\(^1\) and Christian Buss\(^2\)
\(^1\)Jenoptik Optical Systems, LLC, Jupiter, FL, USA
\(^2\)TRIOPTICS GmbH, Wedel, Germany
*Sub-cell turning to accomplish micron-level alignment of precision assemblies*

10:05 am  **BREAK & REFRESHMENTS**

Session 2  
**Session chair: Randy Babbitt**

10:30 am  Aislinn Daniels
Physics Department, Montana State University, Bozeman, MT
*Introduction to spectral hole burning and its applications*

10:50 am  Owen Wolfe
Spectrum Lab, Montana State University, Bozeman, MT
*Interferometric network architectures for optical signal processing applications*

11:05 am  Aaron D. Marsh, A. Bengtsson, P. J. T. Woodburn, L. Rippe, S. Kröll, C. W. Thiel, and R. L. Cone
Physics Department, Montana State University, Bozeman, MT
*Suppression of non-radiative relaxation in Tm\(^{3+}\)-doped materials for oxygenation-sensitive ultrasound optical tomography*

11:35 am  Kyle Olson, P. J. T. Woodburn, A. D. Marsh, C. W. Thiel, and R. L. Cone
Physics Department, Montana State University, Bozeman, MT
*Correlating the effects of crystal defects on inhomogeneous broadening of host phonon modes and the optical transitions of rare-earth-ion dopants*

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

Session 3  
**Session chair: Charles Thiel**

1:10 pm  Natalia Kolnik
Montana Science Center, Bozeman, MT
*Teaching light science in informal education*

1:30 pm  Chris Ebbers, C. W. Thiel, K. Rupavatharam, and W. R. Babbitt
Spectrum Lab, Montana State University, Bozeman, MT
*High purity isotope generation proposed for quantum information systems through atomic vapor laser isotope separation*

1:50 pm  Bradley Slezak and Brian D’Urso
Physics Department, Montana State University, Bozeman, MT
*Towards pulsed quantum optomechanics with a magnetically trapped microsphere*
2:10 pm Sina Dadras and Ioannis Roudas  
Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT  
*Mode-dependent signal delay method: A comprehensive analysis of its accuracy errors*

2:30 pm Ron Logan  
Vice President and Chief Technology Officer, Electronics and Photonics  
Glenair Inc., Glendale CA  
*Rugged photonics transceivers and components for aerospace applications*

2:55 pm **BREAK & REFRESHMENTS**

**Session 4**  
**Commercialization of Optics & Photonics Technology**  
Session Chair: Joseph Shaw

3:20 pm Eric Massaro,1 John Amend,2 and W. R. Babbitt1  
1Spectrum Lab, Montana State University, Bozeman, MT  
2MicroLab, Inc. Bozeman, MT  
*MicroLab: An industrial expansion*

3:40 pm David Dickensheets  
Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT  
*Optics and photonics in the Montana NanoTechnology Facility (MONT)*

4:00 pm Jay Kumler  
Jenoptik Optical Systems, LLC, Jupiter, FL, USA  
*Photonics in USA – Trends and Challenges*

4:30 pm Mark Ranalli  
Dean, Jake Jabs College of Business & Entrepreneurship, MSU  
*Entrepreneurship at MSU*

Bridger Photonics, Bozeman, MT  
*What is gas mapping lidar?*

5:10-6:00 Room transition-Poster set up and booth set up

6:00 – 8:00 pm **Poster Session & MPIA Social with Hors d’oeuvres**

**Session 5 – Poster Session**

**Company exhibits**
- AdvR, Inc  
- Bridger Photonics  
- Glenair, Inc  
- OptoSigma Corp  
- Quantel, USA  
- Resonon, Inc.

**Research Posters**
- Altos Photonics  
- FLIR/Scientific Materials Corp.  
- Lockheed Martin  
- Out of the box Manufacturing  
- Nicholas Fothergill  
- S2 Corp.
1. Joseph Thiebes,1 Alexander Hathaway,1 Casey Kennedy,1 and Erik Grumstrup1,2
Chemistry and Biochemistry Dept., Montana State University, Bozeman, MT
Montana Materials Science Program, Montana State University, Bozeman, MT
Fast carrier migration in time-resolved emission spectra of CsPbBr3 perovskite

2. Casey L. Kennedy,1 Andrew H. Hill,2 Erik M. Grumstrup1,2
Chemistry and Biochemistry Dept, Montana State University, Bozeman, MT
Montana Materials Science Program, Montana State University, Bozeman, MT
Screening links transport and recombination mechanisms in lead halide perovskites

3. Alexander Hathaway,1 Joseph Thiebes,1 Erik Grumstrup1,2
Chemistry and Biochemistry Dept, Montana State University, Bozeman, MT
Montana Materials Science Program, Montana State University, Bozeman, MT
Dynamic redshift of PCDTBT

4. Skyler Hollinbeck
Chemistry and Biochemistry Dept, Montana State University, Bozeman, MT
Montana Materials Science Program, Montana State University, Bozeman, MT
Synthesis of CsPbX3 halide nanocrystals with perovskite-like structure

5. Matthew Strasbourg, Tom Darlington, Jim Schuck, Jim Hone, Nicholas Borys
Physics Department, Montana State University, Bozeman, MT
Unraveling nonlinear formation and relaxation of excitons in atomically thin 2D semiconductors

Physics Department, Montana State University, Bozeman, MT
Quantifying crystal defect densities in rare-earth-doped crystals by gravimetric analysis

Physics Department, Montana State University, Bozeman, MT
Investigation of flux growth methods for producing rare-earth-doped single crystals

Physics Department, Montana State University, Bozeman, MT
Diffusion doping and characterization of rare-earth ions in lithium niobite for quantum transduction

Physics Department, Montana State University, Bozeman, MT
Suppression of rare-earth decoherence for quantum information

Physics Department, Montana State University, Bozeman, MT
Exploring the optical absorption lines of transition metal ions in crystals for photonic signal processing and quantum information applications

11. James Dillon,1 Kevin Hammonds,1 and Rick L. Lawrence2
Civil Engineering Department, Montana State University, Bozeman, MT
Headwater channel detection via LIDAR and cryospheric implications

12. Riley Logan,1 Bryan Scherrer,1 Erica Venkatesulu,2 Jordan Baker,2 Elizabeth Rehbein,1 Prashant Jha,3 Selena Ahmed,4 John Sheppard,5 and Joseph A. Shaw1
1Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT
2NSF Research Experience for Undergraduates, ECE Dept, Montana State Univ., Bozeman, MT
3Southern Agricultural Research Center, Montana State University, Bozeman, MT
4Health & Human Development Dept., Montana State University, Bozeman, MT
5Gianforte School of Computing, Montana State University, Bozeman, MT
Hyperspectral imaging for river ecology, precision agriculture, and sustainable foods

13. Jordan Anspach1,2 and David Dickensheets1
1Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT
2NSF Research Experience for Undergraduates, ECE Dept, Montana State Univ., Bozeman, MT
Bond gap uniformity with precision silica beads in photoresist

14. Anayeli Flores-Garibay,1,2 Jed Pai,1 Torrey McLoughlin,1 Christopher Snider,1 and Wataru Nakagawa1
1Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT
2NSF Research Experience for Undergraduates, ECE Dept, Montana State Univ., Bozeman, MT
Fabrication of Micron-scale Electrodes for Periodic Poling in Nonlinear Optical Crystals

15. Matthew Panipinto,1,2,3 Connor Beck,1 and Anja Kunze1
1Electrical & Computer Engineering Department, Montana State University, Bozeman, MT
2Electrical & Computer Engineering Department, University of Washington, Seattle, WA
3NSF Research Experience for Undergraduates, ECE Dept, Montana State Univ., Bozeman, MT
A multi-modal recording platform for magnetic field stimulation in cell cultures

16. Justin Cook
Executive Director, MSU Innovation Campus
Everything you want to know about the MSU Applied Research Laboratory