



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 Kumler¹ and Christian Buss²
¹Jenoptik Optical Systems, LLC, Jupiter, FL, USA
²TRIOPTICS 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

11:10 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 Tm³⁺-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
- 4:50 pm M. Thorpe, A. Kreitinger, N. Greenfield, E. Seger, S. Gordon, H. Murphy, S. Gardiner, C. Wilson, S. Kreitinger, R. Schmitt, and Pete Roos
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.

Altos Photonics
FLIR/Scientific Materials Corp.
Lockheed Martin
Out of the box Manufacturing
Nicholas Fothergill
S2 Corp.

Research Posters

1. Joseph Thiebes,¹ Alexander Hathaway,¹ Casey Kennedy,¹ and Erik Grumstrup^{1,2}
¹Chemistry and Biochemistry Dept., Montana State University, Bozeman, MT
²Montana 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. Grumstrup^{1,2}
¹Chemistry and Biochemistry Dept, Montana State University, Bozeman, MT
²Montana 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 Grumstrup^{1,2}
¹Chemistry and Biochemistry Dept, Montana State University, Bozeman, MT
²Montana Materials Science Program, Montana State University, Bozeman, MT
Dynamic redshift of PCDTBT
4. Skyler Hollinbeck
¹Chemistry and Biochemistry Dept, Montana State University, Bozeman, MT
²Montana 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
6. Robert Kwapisz, P. J. T. Woodburn, C. W. Thiel, and R. L. Cone
 Physics Department, Montana State University, Bozeman, MT
Quantifying crystal defect densities in rare-earth-doped crystals by gravimetric analysis
7. Jason M. Carr, P. J. T. Woodburn, A. D. Marsh, R. L. Cone, and C. W. Thiel
 Physics Department, Montana State University, Bozeman, MT
Investigation of flux growth methods for producing rare-earth-doped single crystals
8. Sophia Kennedy-Overfelt, K. Olson, P. J. T. Woodburn, A. D. Marsh, C. W. Thiel, and R. L. Cone
 Physics Department, Montana State University, Bozeman, MT
Diffusion doping and characterization of rare-earth ions in lithium niobite for quantum transduction
9. Aaron D. Marsh, J. Doherty, P. J. T. Woodburn, C. W. Thiel, and R. L. Cone
 Physics Department, Montana State University, Bozeman, MT
Suppression of rare-earth decoherence for quantum information
10. Zoe Noble, K. Olson, A. D. Marsh, P. J. T. Woodburn, C. W. Thiel, and R. L. Cone
 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
¹Civil Engineering Department, Montana State University, Bozeman, MT

¹Civil Engineering Department, Montana State University, Bozeman, MT

²Land Resources and Environmental Sciences 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 Anspach^{1,2} 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