



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, the City of Bozeman, and the Montana Photonics Industry Alliance.



Conference Agenda Tuesday, 15 September 2015

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: Wataru Nakagawa

8:30 am Ronald Reano – invited speaker
Associate Professor
Ohio State University, Department of Electrical and Computer Engineering
Corralling photons: controlling light in optical waveguides on the chip-scale

9:05 am Chris Zhang, Warren B. Foster, David L. Dickensheets
MSU Electrical and Computer Engineering
Shaping light for biomedical imaging of thick specimens with active/adaptive microscope

9:25 am Drew Moen, Kevin Repasky, Electrical & Computer Engineering
MSU Electrical and Computer Engineering
Work towards an autonomous diode laser based differential absorption lidar

9:45 am Paul Nugent, Seth Laurie, Allison Walsh, Amber Geer, Joseph Shaw
MSU Electrical and Computer Engineering
Agricultural imaging for weed mapping

10:05 am **BREAK & REFRESHMENTS**

Session 2

Session chair: Randy Babbitt

10:35 am Tyler Brewer, Russell Barbour, Zeb Barber
MSU Spectrum Lab
Generation of spurious signals in nonlinear frequency conversion

10:55 am Briana Jones,¹ Kevin Repasky,¹ Phil Battle²
¹MSU Electrical and Computer Engineering
² AdvR Inc.
Development of a singly-resonant OPO at 1.65 μm for climate cycle science

11:15 am Melissa McIntyre,¹ Marie Lund Traulsen,² Kion Norrman,² Simone Sanna,² Robert A. Walker¹
¹MSU Chemistry and Biochemistry
² Technical University of Denmark
Polarization induced changes in LSM thin film electrode composition observed by in-operando Raman spectroscopy and TOF-SIMS

11:35 am Joe Shaw – morning closing comments and announcements

11:40 am **Lunch** on your own

Session 3

Session chair: Rob Walker

1:00 pm Rose Ahlefeldt,^{1,2} Anne Louchet-Chauvet,² Thierry Chanelière² and Jean-Louis Le Gouët²
¹MSU Fulbright Scholar in Cone-Thiel Group, MSU Physics, from Laser Physics Centre, Research School of Physics & Engineering, Australian Nt'l University, Canberra Australia
²Laboratoire Aimé Cotton, Université Paris-Sud, Orsay, France
Manipulating spin lifetimes in a rare earth crystal using magnetic fields

1:20 pm Kyle Reeping, Robert A. Walker
MSU Chemistry and Biochemistry
In operando vibrational Raman studies of chlorine contamination in solid oxide fuel cells

1:40 pm Laura Dahl, Joseph Shaw
MSU Electrical and Computer Engineering
The variation of skylight polarization in the visible-to-SWIR spectrum

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

- 2:00 pm Joe Shaw – Welcome and recognition of invited guests
- 2:10 pm Doug Fletcher, Marketing Strategist and Business Development Advisor
Fletcher & Company
The path to success: marketing strategy for the technology entrepreneur
- 2:45 pm **BREAK & REFRESHMENTS**
- 3:15 pm Ralph Hutcheson
The Scientific Materials story
- 3:35 pm Rand Swanson – Resonon, Inc.
Resonon, the thrills and spills
- 3:55 pm Russell Barbour – Advanced Microcavity Sensors LLC
The story of an early stage startup
- 4:15 pm Larry Johnson, President of the Montana Photonics Industry Alliance
Montana's emerging photonics industry and the MPIA
- 4:35 pm Joe Shaw, Director of MSU Optical Technology Center
20 years of OpTeC
- 5:10 pm Hors d'oeuvres & poster setup
- 6:00 – 8:00 pm **POSTER SESSION & Hors d'oeuvres**
- 6:30 pm Shaw & Johnson-Montana optics Innovator Award Presentation

Session 5 – Poster Session

Company exhibits and posters

AdvR, Inc.

FLIR/Scientific Materials Corp.

Lattice Materials

Newport/ILX Lightwave

Quantel USA

Altos Photonics

Gentec-USA

Montana Instruments

NWB Sensors, Inc.

Resonon, Inc.

Sensory Labs

Research Posters

1. Cooper McCann,¹ Mikindra Morin,² Kevin Repasky,³ Rick Lawrence,² Scott Powell²
¹ MSU Physics
² MSU Land Resources & Environmental Sciences
³ MSU Electrical & Computer Engineering
Creating Large Area High Resolution Hyperspectral Images for Carbon Sequestration Monitoring
2. Erik Anderson,¹ Connor Dack,¹ David Keltgen,¹ Monica Whitaker,¹ Ross Snider,¹ Rand Swanson²
¹ MSU Electrical & Computer Engineering
² Resonon, Inc.
Leveraging integrated systems technology for real-time hyperspectral image processing
3. Chat Chantjaroen,¹ Kevin Repasky,² John Carlsten¹
¹ MSU Physics
² MSU Electrical and Computer Engineering
A micro pulsed lidar for atmospheric aerosol study
4. Andrew Hill, Eric Massaro, Kori Smyser, Erik M. Grumstrup
MSU Material Science
Charge carrier evolution in methylammonium lead iodide perovskite
5. Eric S. Massaro, Andrew H. Hill, Erik M. Grumstrup
MSU Material Science
Ultrafast super resolution spectroscopy by structured pump-probe microscopy
6. Benjamin Moon, Carol Baumbaer, Sean Nicolaysen, Marquette Stevenson, James Dilts, David L. Dickensheets, Wataru Nakagawa
MSU Electrical & Computer Engineering
Nanostructured linear polarization filters for infrared wavelengths
7. Nate Field, Jacob Fleming, Orrin Boese, Wataru Nakagawa
MSU Electrical & Computer Engineering
Interferometric measurement of optical phase delay for pressure sensing
8. Elizabeth Corbin,¹ Robert Usselman,¹ Renee Reijo-Pera,² Rand Swanson,³ Ross Snider,⁴ Edward Dratz¹
¹ MSU Chemistry & Biochemistry
² MSU VP for Research and Economic Development
³ Resonon, Inc.
⁴ Electrical and Computer Engineering
Developing hyperspectral imaging, optogenetics, and high-performance image processing for monitoring metabolic states of live cells in culture

9. Rebecca Danforth, Bern Kohler
MSU Chemistry and Biochemistry
Excited state dynamics of aqua-iron(III) complexes at low pH utilizing ultrafast transient absorption spectroscopy
10. David Skowron, Bern Kohler
MSU Chemistry and Biochemistry
Subnanosecond Emission from AT DNA Oligonucleotides Compared with Transient Absorption Experiments
11. Katie Link, Eric Gobrogge, Robert A. Walker
MSU Chemistry and Biochemistry
Interfacial behavior of organic species in sea spray aerosols probed with vibrational sum frequency generation
12. Daniel Neuburger, Robert A. Walker
MSU Chemistry and Biochemistry
Effects of steam as a fuel additive in solid oxide fuel cells operating with propane
13. Christine A. Gobrogge, Robert A. Walker
MSU Chemistry and Biochemistry
Unusual temperature dependent partitioning and solvation in phospholipid membranes
14. Tino Woodburn, Charles W. Thiel, Rufus L. Cone
MSU Physics
Using birefringence to orient biaxial crystals for photonic applications
15. Aaron Marsh, Kaitlin Poole, Brett M. Wilkins, Charles W. Thiel, Rufus Cone
MSU Physics
Transparent organic resins for optical nanocomposites at cryogenic temperatures
16. B. M. Wilkins, C. W. Thiel, R. L. Cone
MSU Physics
Measuring low-temperature thermal conductivity of optical materials
17. Kaitlin Poole,¹ William White,² Andreas Schmitt-Sody²
¹ MSU Physics and Air Force Research Laboratory, Albuquerque, NM
² Air Force Research Lab, Albuquerque, NM
Detection of laser produced microwave emission using a heterodyne system
18. Ryan Downey, Seth Kreitinger, Sarah Lukes, David Dickensheets
MSU Electrical and Computer Engineering
Aberration-corrected electronic focus control of a high NA system using a deformable mirror
19. Seth Kreitinger, Michael Heger, David L. Dickensheets
MSU Electrical and Computer Engineering
Miniature CMOS camera for wide-field contextual imaging during in vivo confocal microscopy

20. Warren Foster, Chris Zhang, David L. Dickensheets,
MSU Electrical and Computer Engineering
Static and dynamic characterization of a Boston Micromachines deformable mirror for an active/adaptive microscope

21. Amber Geer, Seth Laurie, Allison Walsh (with Paul Nugent, Ross Snider, Joseph Shaw)
MSU Electrical and Computer Engineering Senior Design Team
Optical imaging system for weed mapping

22. Zeb Barber, Pushkar Pandit, Jason Dahl, Randy Babbitt
MSU Spectrum Lab
Compact compressive laser ranging

23. Tia Sharpe, Zeb Barber, R. Krishna Moyan, W. Randall Babbitt
MSU Spectrum Lab
Fast tuning RF driven optical chirped laser platform