Optical Science & Engineering Conference Agenda

Thursday, October 21, 2021
Inspiration Hall, Norm Asbjornson Hall
(Enter at the east end of the 3rd floor)
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 Graduate Education.

Conference Organizers:
Dr. Joseph Shaw – OpTeC Director
Michelle Leonti – Conference Coordinator

7:45 am CHECK-IN and MORNING REFRESHMENTS

8:00 am Welcome Comments
Joseph Shaw
MSU Optical Technology Center Director

Session 1  Chair: Nicholas Borys

8:10 am FUV spectra of the sun from a CubeSat
Suman Panda, Charles Kankelborg
Physics Dept, Montana State University, Bozeman, MT

8:30 am Sub-diffraction nanoscale Raman imaging of the interface in a 2D semiconductor heterostructure
J. Pierce Fix,1 Souray Garg,2 Andrey Krayev,3 Michael Colgrove,1 Audrey Sulkanen,4 Minyuan Wang,4 Gang-Yu Liu,4 Patrick Kung,5 Nicholas Borys5
1Physics Dept, Montana State University, Bozeman, MT
2Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT
3HORIBA Scientific, Novato, CA
4Chemistry Dept, University of California Davis, Davis, CA
5Electrical & Computer Engineering Dept, The University of Alabama, Tuscaloosa, AL
8:50 am  
*Particle displacement sensing with sub-pixel image analysis: towards the quantum limit*  
Brian D’Urso,¹ Zachariah Etienne²  
¹Physics Dept, Montana State University, Bozeman, MT  
²Physics Dept, University of Idaho, Moscow, ID

9:10 am  
*Diode-laser-based high spectral resolution lidar for tropospheric aerosol observations*  
Luke Colberg, Owen Cruikshank, Kevin Repasky  
Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT

9:30 am  
*Range Selective Digital Holographic Imaging Using FMCW Lidar*  
Matthew Goodman, R. Krishna Mohan, Wm. Randall Babbitt  
Spectrum Lab, Montana State University, Bozeman, MT

9:50 am  
*Characterization of Er3+-doped congruent and stoichiometric LiNbO3 for quantum information applications*  
Thomas Rust, Jason Scott, Adam Olivera, Philip J. T. Woodburn, Rufus L. Cone, Charles W. Thiel  
Physics Dept, Montana State University, Bozeman, MT

10:10 am  
**BREAK & REFRESHMENTS**

Session 2  
Chair: Krishna Rupavatharam

10:30 am  
*Double-reflection transmissive beam scanner for telecom wavelengths*  
Jordan Baker, Wataru Nakagawa, David Dickensheets, Kenneth Lang  
Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT

10:50 am  
*Phase Shift Interferometry for high-precision optical surface characterization*  
Jason Scott, Jacob Sharkansky, Thomas Rust, Rufus L. Cone, Charles W. Thiel  
Physics Department, Montana State University, Bozeman, MT

11:10 am  
*Improved optical remote sensing system to automate respiratory rate and tidal volume measurement*  
Md Siddat Bin Nesar,¹ Karis Trippe,² Bryce Hill,³ Ryan Stapley,⁴ Bradley Whitaker¹  
¹Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT  
²Electrical Engineering Dept, John Brown University, Siloam Springs, AR  
³Electrical Engineering Dept, Montana Technological University, Butte, MT  
⁴Biology Dept, Montana Technological University, Butte, MT

11:30 am  
*Spectral characterization of a division-of-focal-plane polarization imager using a grating monochromator*  
Erica Venkatesulu, Musadeque Syed, Joseph Shaw  
Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT

11:50 pm  
*Analyzing the polarization response of hyperspectral imagers*  
Logan Riley, Erica Venkatesulu, Joseph Shaw  
Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT

12:10 pm  
**Lunch**
Session 3

Chair: David Dickensheets

1:20 pm  
*Development of a spectroscopic ensemble to identify and explore excited state vibrational dynamics of Perylene Diimide superstructures*
Skyler Hollinbeck, Erik Grumstrup
Chemistry & Biochemistry Dept, Montana State University, Bozeman, MT

1:40 pm  
*High Bandwidth Backscanning Mirror for Coherent Chirped Pulse LIDAR Imaging*
Andrew Oliver, David Dickensheets, Samantha Hampshire
Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT

2:00 pm  
*Enhanced multiexciton formation by an electron-hole plasma in 2D semiconductors*
Matthew Strasbourg, Cory Johns, Zoe Nobel, Emalu Yanev, Thomas P. Darlington, James C. Hone, P. James Shuck, Nicholas J. Borys
1Physics Department, Montana State University, Bozeman, MT  
2Mechanical Engineering Dept, Columbia University, New York, NY

2:20 pm  
*Optimized MVM constellations for SDM fibers*
Eric Fink, Jaroslaw Kwapisz, Ioannis Roudas
1Mathematical Sciences Dept, Montana State University, Bozeman, MT  
2Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT

2:40 pm  
BREAK & REFRESHMENTS

Session 4

Chair: Kevin Repasky

3:00 pm  
*Impact of Crosstalk in multicore fiber for hybrid classical and quantum communication network*
Ekaterina Ponizovskaya-Devine, Alexander Kaufman, Alan Lu, Krishna Rupavatharam
Spectrum Lab, Montana State University, Bozeman, MT

3:20 pm  
*Stimulated Raman Activated Cell Sorting*
Jonah Theisen, Michael Neubauer, Anthony Kohtz, Stephan Warnat, Roland Hatzenpichler, Erik Grumstrup
Chemistry & Biochemistry Dept, Montana State University, Bozeman, MT

3:40 pm  
*A bio-fluorescence hyperspectral imaging application*
Slater Kirk, Mike Kehoe
Resonon, Inc., Bozeman, MT

4:00 – 5:30 pm  
**Poster / Company Exhibit Session**

Session 5 – Poster / Company Session

Company exhibits

*Bridger Photonics*  
*Out of the Box Manufacturing*  
*MaRCTech2, Inc.*  
*Resonon, Inc.*
Research Posters

1. Structure-property relationships of strain-induced ultrabright nanoscale emitters in a hybrid 2D semiconductor metal system
Mohammad Soroush, Nicholas J. Borys
Physics Department, Montana State University, Bozeman, MT

2. Dynamic control of excitons in single-layer WSe2 with surface acoustic waves
Sheikh Parvez,1 Samuel Berweger,2 Nicholas J. Borys1
1Physics Department, Montana State University, Bozeman, MT
2National Institute of Standards and Technology, Boulder, CO, USA

3. Fabrication of embedded plasmonic antennas for nano-optomechanics with 2D materials
Joe Stage,1 Nicholas J. Borys,1 Andrew Lingley,2 Wataru Nakagawa2
1Physics Department, Montana State University, Bozeman, MT
2Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT

4. Impact of lattice strain on charge carrier dynamics of lead halide perovskites
Sajia Afrin, Erik Grumstrup
Chemistry and Biochemistry Dept, Montana State University, Bozeman, MT

5. Emma Orcutt, Shelton Varapragasam, Erik Grumstrup
Chemistry and Biochemistry Dept, Montana State University, Bozeman, MT
Understanding excited state dynamics in silver-modified graphitic carbon nitride with ultrafast spectroscopic techniques

6. Experimental characterization of commercial wire-grid polarizers as near-infrared polarizing beam splitters
Kenneth Lang, Jordan Baker, David Dickensheets, Wataru Nakagawa,
2Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT

7. Optical coherent storage: From photon echo to McCall-Hahn soliton
Aleks Rebane,1 Hans Riesen2
1Physics Department, Montana State University, Bozeman, MT
2Physical Chemistry/Chemical Physics Dept, The University of New South Wales, Canberra, Australia

8. Modeling the smile aberration in imaging spectrometers
Slater Kirk, Mike Kehoe
Resonon, Inc., Bozeman, MT

9. Optical transmittance of 3D printing materials
Shannon M. Hamp, Riley D. Logan, Joseph A. Shaw
Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT

10. Measuring cloud thermodynamic phase with a low cost imaging polarimeter
Musaddeque Syed, Erica Venkatesulu, Joseph A. Shaw
Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT
11. **Hyperspectral imaging for river ecology**  
    Madison A. Torrey, Riley D. Logan, Shannon Hamp, Charlie Nicholson, Joseph A. Shaw  
    Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT

12. **Detection of flying insects using lidar**  
    Trevor C. Vannoy, Riley D. Logan, Elizabeth M. Rehbein, Joseph A. Shaw, Bradley M. Whitaker  
    Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT

13. **Fiber-Coupled FMCW Lidar**  
    John Lawson Turcotte\(^1\), Michael R. Roddewig\(^1\), Joseph A. Shaw\(^2\)  
    \(^1\)Brigham Young University-Idaho, Rexburg, ID  
    \(^2\)Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT

14. **Coherent heterodyne receiver**  
    Alexander Brisson, Alan Lu, Stephen Crouch, Wm. Randall Babbitt, Krishna Rupavatharam  
    Spectrum Lab, Montana State University, Bozeman, MT

15. **Range selective digital holography using time of flight cameras**  
    Cole Hammond, Wm. Randall Babbitt, R. Krishna Mohan  
    Spectrum Lab, Montana State University, Bozeman, MT

16. **Preservation of Photon Coincidence After Transmission through Multicore Fiber**  
    Alexander Kaufman, Jason Mickel, Krista Drummond, Krishna Rupavatharam  
    Spectrum Lab, Montana State University, Bozeman, MT

17. **Construction of Hong-Ou-Mandel Interferometer for Quantum Network Research**  
    Nathan Kuehl, Krishna Rupavatharam, Krista Drummond  
    Spectrum Lab, Montana State University, Bozeman, MT

18. **Applications of DP-QPSK modulators for coherent lidar and quantum communications**  
    Alan Lu, Krishna Rupavatharam, Wm. Randall Babbitt, Stephen Crouch, Alexander Brisson  
    Spectrum Lab, Montana State University, Bozeman, MT

19. **Fog emulation for applications in digital holography**  
    Brianne Malchow, Wm. Randall Babbitt, Krishna Rupatharam, Michelle Milvich  
    Spectrum Lab, Montana State University, Bozeman, MT

20. **Use of fog emulator for lidar and digital holography measurements**  
    Corey Pearson, Krishna Rupavatharam, Wm. Randall Babbitt, Brianne Malchow, Jaime Neeley, Michelle Milvich  
    Spectrum Lab, Montana State University, Bozeman, MT

21. **Demonstration of Interferometric Readout for Spatial Spectral Holographic Spectrum Analysis**  
    Owen R. Wolfe, R. Krishna Mohan, Wm. Randall Babbitt  
    Spectrum Lab, Montana State University, Bozeman, MT
22. *Auger electron spectroscopy for surface ferroelectric domain characterization in periodically poled lithium niobate*
   Torrey McLoughlin,¹ Wm. Randall Babbitt,¹ Phillip A. Himmer,² Wataru Nakagawa²
   ¹Physics Dept, Montana State University, Bozeman, MT
   ²Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT

23. *Creation of correlated photons via spontaneous parametric down conversion (SPDC) for use in quantum communication systems*
   Jason Mickel, Christopher Ebbers, R. Krishna Mohan
   Spectrum Lab, Montana State University, Bozeman, MT

24. *Opto-mechanical design, analysis, and test of monostatic transmit/receive module for coherent active imaging*
   Jaime Neeley, Wm. Randall Babbitt, Krishna Rupavatharam, Michelle Milvich, Matthew Goodman
   Spectrum Lab, Montana State University, Bozeman, MT

25. *Digital holographic polarimeter using dual reference beam interferometry*
   Matthew Goodman, R. Krishna Mohan, Zeb W. Barber, Wm. Randall Babbitt
   Spectrum Lab, Montana State University, Bozeman, MT