Optical Science & Engineering Conference

Online via Webex from Montana State University – Bozeman, Montana
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Presented by the MSU Optical Technology Center (OpTeC), with support from the MSU Vice-President for Research and Economic Development.

Conference Agenda
Thursday, October 29, 2020
(with talks continuing during the OpTeC colloquium at 4:10 pm on future Thursdays)

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

Session 1 (29 Oct. 2020)  Session chair: Joseph Shaw

9:00 am  **Cole Hammond**, Krishna Rupavatharam, and W. Randall Babbitt
Spectrum Lab, Montana State University, Bozeman, MT
*Time of flight cameras and their application in holography*

9:20 am  **Aaron D. Marsh**, P. J. T Woodburn, T. L. Rust, C. W. Thiel, R. L. Cone
Physics Dept., Montana State University, Bozeman, MT
*New materials for rare-earth-based quantum information applications at telecommunications wavelengths*

Chemistry & Biochemistry Dept., Montana State University, Bozeman, MT
*Resonant Second Harmonic Studies of the Néel Transition in Nickel Oxide*
10:00 am  Trevor Vannoy,¹ Jackson Belford,¹ Joseph Aist,¹ Kyle Rust,¹ Trey Scofield,¹ James H. Churnside,¹ Michael Roddewig,² Joseph A. Shaw,¹,³ Bradley Whitaker¹  
¹ Electrical & Computer Engineering Dept., Montana State University, Bozeman, MT  
² National Oceanic & Atmospheric Admin., Earth Systems Research Lab, Boulder, CO  
³ Optical Technology Center, Montana State University, Bozeman, MT  
*Machine learning for detecting fish in airborne LIDAR measurements of water bodies*

10:20 -10:40 am  BREAK

Session 2 (29 Oct. 2020)  
Session chair: Wataru Nakagawa

10:40 am  Katelyn M. Duncan,¹ Christine A. Gobrogge,¹ Rhys Trousdale,¹ William Steel,² and Robert A. Walker¹,³  
¹ Chemistry & Biochemistry Dept., Montana State University, Bozeman, MT  
² Chemistry Dept., York College of Pennsylvania, York, PA  
³ Montana Materials Science Program  
*Quantitative membrane partitioning studies of ecologically relevant synthetic organic molecules*

11:00 am  Owen Wolfe,¹,² Wm. Randall Babbitt,¹,² R. Krishna Mohan¹  
¹ Spectrum Lab, Montana State University, Bozeman, MT  
² Physics Dept., Montana State University, Bozeman, MT  
*Differential Interferometric SSH Lidar*

11:20 am  Kevin Repasky  
Electrical & Computer Engineering Dept., Montana State University, Bozeman, MT  
*Semiconductor-based lidar for probing the lower troposphere*

11:40 am  Michael Roddewig  
Optical Technology Center, Montana State University, Bozeman, MT  
*Basic FMCW Lidar Design*

12:00 pm  Lunch break

Session 3 (29 Oct. 2020)  
Session chair: Charles Thiel

1:00 pm  Nathaniel Field,¹ Michael R. Roddewig,² and Joseph A. Shaw¹,²  
¹ Electrical & Computer Engineering Dept., Montana State University, Bozeman, MT  
² Optical Technology Center, Montana State University, Bozeman, MT  
*Quasi-monostatic polarimetric BRDF measurements: Device, procedure, and results*

1:20 pm  John Sample, Joseph Wishart, Matthew Thompson  
Physics Department, Montana State University, Bozeman, MT  
*Development of a High Throughput Solar X-ray Spectrometer Using SiPMs*

1:40 pm  Torrey McLoughlin,¹ Wm. Randall Babbitt,¹ Phillip A. Himmer,² and Wataru Nakagawa²  
¹ Physics Department, Montana State University, Bozeman, MT  
² Electrical & Computer Engineering Dept, Montana State University, Bozeman, MT  
*Auger electron spectroscopy for surface ferroelectric domain differentiation in selectively poled MgO:LiNbO3*
2:00 pm  **Thomas L. Rust**, Aaron D. Marsh, Sophia Kennedy-Overfelt, Philip J. T. Woodburn, Charles W. Thiel, Rufus L. Cone
Physics Dept., Montana State University, Bozeman, MT
*Thin-film Er$^3+$-doped LiNbO$_3$ via molten salt ion exchange*

2:20 - 2:40 pm  **BREAK**

Session 4 (29 Oct. 2020)  
Session Chair: W. Randall Babbitt

2:40 pm  **Matthew Strasbourg**, 1 Cory Johns, 1 Zoe Noble, 1 Emanuil Yanev, 2 Thomas P. Darlington, 2 P. James Schuck, 2 James C. Hone, 2 Nicholas J. Borys 1
1 Physics Dept., Montana State University, Bozeman, MT
2 Mechanical Engineering Dept., Columbia University, New York, NY
*Enhanced multiexciton formation by an electron-hole plasma in 2D semiconductors*

3:00 pm  **Alex Kaufman**, 1, 2 Krishna Rupavatharam, 1 Randy Babbitt 1, 2
1 Spectrum Lab, Montana State University, Bozeman, MT
2 Physics Dept., Montana State University, Bozeman, MT
*WavePy3: A wave optics package for Python 3*

3:20 pm  **Jason Carter**
Vice President for Research, Economic Development, and Graduate Education
Montana State University, Bozeman, MT
*Greetings from Montana Hall*

3:30 pm  **Joseph A. Shaw** 1, 2
1 Electrical & Computer Engineering Dept., Montana State University, Bozeman, MT
2 Optical Technology Center, Montana State University, Bozeman, MT
*A brief history of optics and photonics in Montana*

3:50 - 4:10 pm  **BREAK**

Session 5 – Keynote (29 Oct. 2020)  
Session Chair: Joseph Shaw

4:10 pm  **Joseph Goodman**
Stanford University
*Fourier Transforms and Fourier Optics with Mathematica*
Talks given during future colloquia (4:10 pm on Thursdays)

12 Nov. 2020  4:10 pm  **John (Ioannis) Roudas**,1 Jaroslaw Kwapisz,2 and Xin Jiang3
1 Electrical & Computer Engineering Dept., Montana State University, Bozeman, MT
2 Mathematical Sciences Dept., Montana State University, Bozeman, MT
3 Engineering & Environmental Science Dept., College of Staten Island, City University of New York, Staten Island, NY
*Nonlinear noise in coherent optical communications systems*

19 Nov. 2020, 4:10 pm  **Charles Kankelborg**
Physics Dept., Montana State University, Bozeman, MT
*FURST solar spectroscopy mission*

14 Jan. 2021  4:10 pm  **Nathan Kuehl** and Christopher Ebbers
Physics Dept., Montana State University, Bozeman, MT
*Troubleshooting, repair and calibration of Burleigh WA-1500 Wavemeter*

4:35 pm  **Bryan Scherrer**, Kevin Repasky, and Joseph A. Shaw
Electrical & Computer Engineering Dept., Montana State University, Bozeman, MT
*Model and simulation of wing-beat modulation lidar for making 3D maps of flying insects*

21 Jan. 2021, 4:10 pm  **Wataru Nakagawa**
Electrical & Computer Engineering Dept., Montana State University, Bozeman, MT
*Nanophotonics Applications and Sabbatical Exploration*

28 Jan. 2021, 4:10 pm  **Riley D. Logan**, Elizabeth Rehbein, and Joseph A. Shaw
Electrical & Computer Engineering Dept., Montana State University, Bozeman, MT
*Drone-based hyperspectral imaging for river ecology*

4:35 pm  **Shannon Hamp**, Riley Logan, and Joseph A. Shaw
Electrical & Computer Engineering Dept., Montana State University, Bozeman, MT
*VIS-SWIR optical transmittance measurements of 3D printing materials*

4 Feb. 2021, 4:10 pm  **Brian D’Urso**
Physics Dept., Montana State University, Bozeman, MT
*Towards precision pulsed levitated optomechanics in a magneto-gravitational trap*

11 Feb. 2021, 4:10 pm  **Musaddeque Syed, Erica Venkatesulu**, and Joseph A. Shaw
Electrical & Computer Engineering Dept., Montana State University, Bozeman, MT
*Characterization of a division-of-focal-plane polarization imager*