



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

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- 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
- 9:40 am **Marshall T. McNally**, Augustin A. Pineda, and Robert A. Walker
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,² Michael Roddewig,³ Joseph A. Shaw,^{1,3} Bradley Whitaker¹
¹Electrical & Computer Engineering Dept., Montana State University, Bozeman, MT
²National Oceanic & Atmospheric Admin., Earth Systems Research Lab, Boulder, CO
³Optical 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. Walker^{1,3}
¹Chemistry & Biochemistry Dept., Montana State University, Bozeman, MT
²Chemistry Dept., York College of Pennsylvania, York, PA
³Montana 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
Spectrum Lab, Montana State University, Bozeman, MT
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. Shaw^{1,2}
¹Electrical & Computer Engineering Dept., Montana State University, Bozeman, MT
²Optical 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
¹Physics Department, Montana State University, Bozeman, MT
²Electrical & 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 Er³⁺-doped LiNbO₃ 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. Borys¹
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