MONTANA STATE UNIVERSITY | Optical Technology Center

31st ANNUAL OpTeC CONFERENCE

Highlighting Optical Science & Engineering

OCTOBER 9, 2025

Inspiration Hall, Norm Asbjornson Hall
Montana State University, Bozeman, Montana
Enter through the south-facing door on the 2nd floor

Conference Organizers:
Dr. Brian D'Urso, Interim OpTeC Director
Dr. Riley Logan, Assistant Professor
Dr. Joseph Shaw, OpTeC Director
Michelle Leonti, Conference Coordinator

We extend our heartfelt gratitude to our sponsors for their generous support!

7:45 am **CHECK-IN and MORNING REFRESHMENTS**

8:10 am *Conference Opening Remarks*
Joseph Shaw
Optical Technology Center Director, Montana State University

8:15 am *OpTeC: It Began at Bridger Bowl*
Keynote Speaker: **John Carlsten**
OpTeC Founder, Emeritus Professor of Physics, Montana State University

Session 1 Chair: Riley Logan

8:30 am *Micropulse differential absorption lidar for boundary layer studies*
Luke Colberg, Kevin S. Repasky
Electrical and Computer Engineering Department, Montana State University

8:50 am *Understanding air-independent combustion with optical emission spectroscopy*
Brahm Dean, Robert Walker
Department of Chemistry& Biochemistry, Montana State University

9:10 am *Bi-chromatic entanglement distribution co-propagating with 1 tbps classical traffic in multicore fiber*
Joshua Dugre, Krishna Rupavatharam
Spectrum Lab and QCORE, Montana State University

9:30 am *Precision photonics for levitated optomechanics*
Brian D'Urso
Department of Physics, Montana State University

9:50 am *Range-selective digital holography for 3D imaging*
Corey Pearson, Cole Hammond, Krishna Rupavatharam, Wm. Randall Babbitt,
Spectrum Lab, Montana State University

10:10 am **BREAK & REFRESHMENTS**

Session 2 Chair: Brian D'Urso

10:40 am *Noise measured by back-illuminated silicon sensors modeled using partial charge collection*
Roy T. Smart,[1] Charles C. Kankelborg,[1] J.D. Parker[2]
[1]Department of Physics, Montana State University
[2]NASA/GSFC

11:00 am *Optics and Photonics: The Gateway to Quantum Education*
Suzi Taylor,[1] Jeannie Chips[2]
Science Math Resource Center, Montana State University
Department of Education, Montana State University

11:20 am *NanoFrazor-induced phase engineering in 2d materials*
Amirhossein Hasani,[1] T. De Silva,[1] M. Soroush,[1] H. Taghinejad,[2] J. Stage,[1] A. Ghiotto,[2] P. Madathil,[2] N. Borys,[1] J. Analytis[2]
[1] Department of Physics, Montana State University
[2]University of California, Berkeley

11:40 pm *Imaging quantum defects in WSe2 using embedded plasmonic nanoantennas*
Joseph Stage,[1] E. Stuvland,[1] L. N. Holtzman, J. C. Hone,[2] Andrew Lingley,[3] Nicholas J. Borys[1]
[1]Department of Physics, Montana State University
[2]Columbia University
[3]Electrical and Computer Engineering Department, Montana State University

12:00 pm *Moon polarization imaging and modeling*
Erica Venkatesulu,[1] E. C. Duley,[2] Riley D. Logan,[1] Joseph A. Shaw,[1]
[1]Electrical and Computer Engineering Department, Montana State University
[2]Vasser College

12:20 pm *Welcome Address*
Brock Tessman
President, Montana State University

12:25 pm **Lunch (provided)**

Session 3 Chair: Lee Spangler

1:20 pm *The Fate of a Photon: From Environmental Monitoring to Biophotonics*
Riley D. Logan
Electrical and Computer Engineering Department, Montana State University

1:40 pm D*evelopment of integrated photonics: co-packaged optics-based connectors and 3D-printed fiber-tip devices*
Parvinder Kaur Gill
Electrical and Computer Engineering Department, Montana State University

2:00 pm *Study of the index of refraction and thermal expansion at cryogenic temperatures for phase-sensitive applications of rare-earth-activated optical materials in quantum information systems*
Theron Wilkinson, Jason Scott, Charles W. Thiel
Department of Physics, Montana State University

2:20 pm *Orbital angular momentum phase matching in stimulated photon echoes and applications*
Owen Wolfe, Joshua Dugre, Krishna Rupavatharam
Spectrum Lab, Montana State University

2:40 pm *Advances in Two-Photon Polymerization for Industrial Microoptics Manufacturing*
Georg Winkler
UpNano GmbH (Austria)

3:00 pm **BREAK & REFRESHMENTS (NAH 165)**

Session 4 Chair: Joseph Shaw

3:15 pm *In Search of Passion*
John Carlsten
OpTeC Founder, Emeritus Professor of Physics, Montana State University

3:40 pm *The Bridger Photonics Story and What's Next*
Pete Roos
Co-Founder and Chief Innovation Officer
Bridger Photonics, Inc.

4:05 pm *Headwaters Tech Hub Announcement*
Tim VanReken
Headwaters Tech Hub

4:10 pm *Montana Optics Innovator Awards*
Joseph Shaw
Optical Technology Center Director, Montana State University

Session 5 4:30 – 6:00 pm Demonstration Stations & Poster Pitches First Floor Atrium

Session 6 6:00 – 8:00 pm (dinner provided) Poster / Exhibitor Session & MPQA Networking Social Inspiration Hall

Exhibitors

AdvR, Inc.
Altos Photonics, Inc.
Edmund Optics, Inc.
Gentec Electro-Optics Inc.
Headwaters Tech Hub
Keysight Technologies, Inc.
Lumibird, Inc.
Marctech2
Montana Photonics & Quantum Alliance (MPQA)
OptoSigma Corporation
Out of the Box Manufacturing
Quartus Engineering
Shadow Ridge Analytics (The Eido Tech Project)
Shimadzu Scientific Instruments
Spark Photonics Foundation
SPIE
Thorlabs, Inc.
UpNano GmbH

6:00 pm Evening Welcoming Remarks
Joseph Shaw, OpTeC Director
Alison Harmon, Vice President for Research & Economic Development
Sponsors
Montana Department of Labor & Industry
Jason Yager, Executive Director, Montana Photonics and Quantum Alliance

Research Posters

Poster No.	Poster Title	Presenting Author
1	*Radiometric and air quality monitoring with optical instruments*	Anderson, Milo
2	*Drone test jig for Free Space Optical (FSO) communication*	Balas, Christopher
3	*Stationary target tracking from a moving system*	Becker, Zachary
4	*Mixed-dimensional heterostructures for functionalizing transition metal dichalcogenides*	Benton, Kendall
5	*Modular interconnects and fast readout for neutral atom qubits*	Bharat, Saransh
6	*Optical phase locked loop to improve laser coherence length*	Broderick, James
7	*Multi-wavelength free-space optical transceiver with automated acquisition and tracking algorithm*	Courtnage, Ciaran
8	*Specific effects of Cr3+ dopant ions on diluted magnetic semiconductor Sb2-xCrxTe3 quantum dots in a glass matrix*	da Luz, Mario
9	*Patterning phase transitions in MoTe2 using the NanoFrazor*	de Silva, Thiloka
10	*Design and development of a cheap ecdl*	Ferrell, Thomas
11	*Temperature-dependent biomass emission during combustion: Tying laboratory measurements to field-based emission factors*	Fesomade, Kayode
12	*3D printed optical gratings for visible spectrometer/wavemeter*	Fritsch, Sam
13	*Metallization of micro-optics fabricated using two-photon polymerization*	Fritsch, Sam
14	*Investigations of Tm3+ doped lithium tantalate for integrated photonic quantum hardware*	Gall, Carter
15	*Stabilization of range-selective digital holography using FMCW lidar*	Hammond, Cole
16	*Optical serrodyning using high amplitude intensity modulation*	Hayes, Reece

Poster No.	Poster Title	Presenting Author
17	*Ultra-low damping of composite graphite rods in a magneto-gravitational trap*	Jessup, Cody
18	*Attention and edge-aware band selection for efficient hyperspectral classification of burned vegetation*	Karankot, Mahmad Isaq
19	*A flexible platform for multi-beam alignment using a spatial light modulator*	Kirkland, Grant
20	*Multichannel polarization entangled photon source for quantum network research*	Kuehl, Nathan
21	*High spectral resolution lidar development and initial results for vertical profiling wildfire smoke aerosols*	Maxwell, Dylan
22	*Radiometric calibration of compact thermal cameras undergoing rapid temperature changes*	Mickelson, Brandon
23	*Mixed-dimensional (0D-2D) heterostructures for multifunctional photonic applications*	Mueller, Tagert
24	*Non-contact vibrational analysis using frequency modulated continuous wave lidar*	Naberhaus, Owen
25	*Holographic particle tracking for high precision measurement of Newton's gravitational constant, G*	Naderishahab, Tahereh
26	*Hyperspectral imaging for herbicide-resistant biotype classification in wild oat*	Nelle, Connor
27	*Quantum emitters in strain-engineered monolayer WS_2 channels*	Parvez, Sheikh
28	*Entangled single photon filtering using rare earth ion crystals*	Pritchard, Eric
29	*CO_2 photoreduction on bulk PCN-222: spectroscopy, reactivity, and defect structure*	Rifore, Belief
30	*Automated multi-camera calibration and realtime 3D point cloud stitching using ArUco markers*	Rohn, Caleb
31	*Methods for algae identification using a UAV-mounted multispectral imager*	Roosen, Amelia
32	*Design and fabrication of anti-reflection coatings for wire-grid polarizers with silicon substrates*	Saltzman, Owen
33	*Applications of rare-earth-activated materials across the quantum information infrastructure*	Scott, Jason

Poster No.	Poster Title	Presenting Author
34	*Aquatic lidar capabilities at Montana State University*	Shea, Stevens
35	*COTS gimbals as the coarse pointing system for free-space optical communication*	Short, Griffin
36	*Precision gravity sensing with a compact, robust atom interferometer*	Siebor, Christopher
37	*Electromagnetically induced transparency and saturated absorption spectroscopy*	Spitler, Ansel
38	*A MEMS device for the strain tuning of 2D materials under cryogenic conditions*	Torgerson, Nikolas
39	*Investigation of divalent thulium in Bridgman-grown sodium chloride host crystals for quantum information applications*	Treaster, Matthew
40	*Preliminary results from an all-sky polarization imager*	Venkatesulu, Erica
41	*Study of the index of refraction and thermal expansion at cryogenic temperatures for phase-sensitive applications of rare-earth-activated optical materials in quantum information systems*	Wilinson, Theron