



MONTANA
STATE UNIVERSITY

Optical Technology Center

32nd Annual OpTeC Conference

Highlighting Optical Science and Engineering

Thursday, October 8, 2026

Montana State University • Bozeman, Montana

7:45 AM Check-in & Hot Breakfast

Conference Locations

Oral Presentations 8:15 AM to 5:05 PM Room 201 (Inspiration Hall) Norm Asbjornson Hall Enter through the south-facing door on the 2 nd floor	Poster Pitches 5:10 PM to 6:00 PM Norm Asbjornson Hall Atrium First Floor Seating available on Spanish stairs	Exhibitors & Research Posters 6:00 PM to 8:00 PM Ballroom A Strand Union Building (SUB) North of Norm Asbjornson Hall	Thorlabs Mobile Photonics Lab Experience 3-Day Event 10/8 – Intro to Photonics 10am-4pm Behind Norm Asbjornson Hall 10/9 – Fiber Coupling 10am-4:30pm Behind Norm Asbjornson Hall 10/10 – Intro to Photonics 10am-4pm @ Museum of the Rockies
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Sponsors

SPIE OPTICA



THORLABS



BOZEMAN MT



Edmund optics



Conference Organizers

Joseph Shaw, Director

Brian D'Urso, Associate Director

Riley Logan, Associate Director

Michelle Leonti, Conference Coordinator

Optical Technology Center

Thorlabs Mobile Photonics Lab Experience

Three-Day Event

The Thorlabs Mobile Photonics Lab offers students a hands-on experience with photonics equipment used to measure, study, and harness the power of light. Guided by current Thorlabs employees, students are introduced to key photonics concepts, gain insight into potential careers, and engage with individuals that have years of experience working in the field.

Thursday, 10/8 - Intro to Photonics Experience
10 AM – 4 PM

Friday, 10/9 –Fiber Coupling Experience
10 AM – 4:30 PM, Registration Required:
<https://www.signupgenius.com/go/MLatMSU#/>

Saturday, 10/10 – Intro to Photonics Experience @ Museum of the Rockies,
10 AM

Conference Opening Keynote Speaker

Room 201 (Inspiration Hall), Norm Asbjornson Hall

7:45 AM *Check-In and Hot Breakfast*

8:15 AM *Opening Remarks*

Joseph Shaw, Director, Optical Technology Center, Montana State University

8:30 AM *Teaching optical design at scale: Lessons from the University of Rochester*

Julie L Bentley

Institute of Optics, University of Rochester, Rochester, NY, USA

Oral Presentations

Session 1

8:50 AM *Photonics and Robotics in Chur, Switzerland*

Hannes Merbold,¹ Tobias Leutenegger,¹ Mirco Seeli,¹ Philipp Roebrock,¹ Gion-Pol Catregn,¹ Andreas Bitzer,¹ Ursin Soler,¹ Christian Bermes,¹ Yves Diggelmann,¹ Noel Frey,¹ Robin Derungs,¹ Philipp Roebrock,¹ Ursin Soler,¹ Marco Ruggia,² Manuel Schlegel,¹ Simon Müller,¹ Udo Birk¹

¹ University of Applied Sciences of the Grisons, Institute of Photonics and Robotics, Chur, Switzerland

² University of Twente, Faculty of Engineering Technology, Twente, The Netherlands

9:10 AM *Custom airborne radiometer for validation of short-wave infrared satellite snow products*

Shannon Hamp,¹ Riley D. Logan,^{1,2} Eric A. Sproles,³ Joseph A. Shaw^{1,2}

¹Optical Technology Center, Montana State University, Bozeman, MT, USA

²Electrical and Computer Engineering Department, Bozeman, Montana, USA

³Geospatial Core Facility, Earth Sciences Department, Montana State University, Bozeman, Montana, USA

9:30 AM *Evaluating uncertainties in modeled snow reflectance from multispectral remote sensing using UAV-based and field-based hyperspectral imaging*

Jeremy Wood, Eric A. Sproles,¹ Duilio Fonseca-Gallardo,¹ Joseph A. Shaw,¹ Shannon M. Hamp,² Riley D. Logan,² Henna-Reetta Hannula,³ Roberta Pirazzini³

¹Montana State University, Geospatial Core Facility, Earth Sciences, Bozeman, MT, USA

²Montana State University, Optical Technology Center, Electrical Engineering, Bozeman, MT, USA

³Finnish Meteorological Institute, Helsinki, Finland

9:50 AM *UAV-based multispectral optical sensing for AI-driven plant-level Potato Virus Y detection*
Muhammad Shehzore Hashmi,¹ Bradley M. Whitaker,¹ Paul W. Nugent²
¹Department of Electrical and Computer Engineering, Montana State University, Bozeman, MT USA
²Department of Land Resources and Environmental Sciences, Montana State University, Bozeman, MT, USA

10:10 AM *Diode-laser-based direct-detection Doppler wind lidar and high spectral resolution lidar*
Luke Colberg, Kevin S. Repasky
 Electrical and Computer Engineering, Montana State University, Bozeman, MT, USA

10:30 AM BREAK

Session 2

10:50 AM *Exciton diffusion dynamics in strain-localized WS₂ nanobubble quantum emitters*
Mohammad Soroush,^{1,2} Matt Strasbourg,^{2,3} Joe Stage,² Deep Jariwala,⁴ P. James Schuck,³ Nick Borys,^{2,5} David Dickensheets¹
¹Department of Electrical and Computer Engineering, Montana State University, Bozeman, MT, USA
²Department of Physics, Montana State University, Bozeman, MT, USA
³Department of Mechanical Engineering, Columbia University, NYC, NY, USA
⁴Electrical and Systems Engineering, University of Pennsylvania, Philadelphia, Pennsylvania, USA
⁵Department of Physics and Astronomy, University of Utah, Salt Lake City, USA

11:10 AM *Thin films and heterostructures for engineering light-matter interactions*
Brelon J. May^{1,2}
¹QCORE, Montana State University
²Condensed Matter Physics and Material Science, Idaho National Laboratory, Idaho Falls, ID, USA

11:30 AM *Pairing operando Raman spectroscopy and electrochemical analysis to describe DC-SOFC function and degradation*
Keegan Walker,¹ Kylie Held,¹ Robert Walker¹
 Department of Chemistry and Biochemistry, Montana State University, Bozeman, MT, USA

11:50 AM *Illuminating communication patterns in neuronal ensembles: Optical readouts and new tools to modulate bottom-up neuronal circuits*
Anja Kunze,¹ Rafat Tazim,¹ Connor L. Beck^{1, 2}
¹Montana State University, Electrical and Computer Engineering Department, Bozeman, MT, USA
²Purdue University, Weldon School of Biomedical Engineering, West Lafayette, IN, USA

12:10 PM	LUNCH
Session 3	
1:00 PM	<i>Engineering novel materials for the Infrared</i> Kathleen A. Richardson College of Optics and Photonics, University of Central Florida, CREOL, Orlando, FL, USA
1:10 PM	<i>Powerful lasers, Fusion Energy and Directed Energy</i> Martin Richardson Center for Directed Energy, University of Central Florida, Orlando, FL, USA
1:20 PM	<i>Self-coherent holographic reconstruction for physically layer-encrypted optical communication</i> Cole Hammond , Krishna Rupavatharma Spectrum Lab, Montana State University, Bozeman, MT, USA
1:40 PM	<i>Programmable photonic mode vector receivers</i> Aishik Biswas , Md. Atiqur Rahman, Ioannis Rouda Department of Electrical and Computer Engineering, Montana State University, Bozeman, MT, USA
2:00 PM	<i>Entangled photon interactions with rare-earth ion-doped materials</i> Eric Pritchard , Owen Wolfe, Joshua Dugre, Krishna Rupavatharam Spectrum Lab, Montana State University, Bozeman, MT, USA
2:20 PM	<i>2D exciton-polaritons for classical and quantum photonic computing</i> Li He Physics Department, Montana State University, Bozeman, MT, USA
2:40 PM	<i>Updates from SPIE</i> Kent Rochford Chief Executive Officer, SPIE
2:50 PM	<i>Updates from Optica</i> Gisele Bennett President, Optica
3:00 PM	BREAK

Session 4 - Industry Session

- 3:15 PM** *Advances in two-photon polymerization for industrial microoptics manufacturing*
Erika Bechtold
UpNano GmbH
- 3:30 PM** *Frequency-Stabilized Lasers*
Tim Day
Monarch Quantum
- 3:45 PM** *Entanglement networks, from deployment to quantum advantage*
Mehdi Namazi
Qunnect
- 4:00 PM** *Leading in Deep Tech Today*
Michele Nichols
Launch Team Inc.
- 4:15 PM** *MSU Optical Metrology Lab: New shared resource*
Nathaniel J. Field,¹ Mark Craig,¹ Riley D. Logan,^{2,3} Joseph A. Shaw^{2,3}
¹Gallatin College, Montana State University, Bozeman, MT, USA
²Department of Electrical and Computer Engineering, Montana State University, Bozeman, MT, USA
³Optical Technology Center, Montana State University, Bozeman, MT, USA
- 4:30 PM** *From lab to system: Commercializing integrated photonic products in Montana*
Sean Spillane, Jason Yager, Timothy Pendrell
Montana Photonics and Quantum Alliance
- 4:45 PM** *Packaging and assembly for Photonic Integrated Chips*
Albert Hasper
Phix Photonics Assembly

Session Ends

Poster Pitches

Norm Asbjornson Hall Atrium, First Floor – Seating is available on the Spanish stairs

- 5:10 pm** *Students will present a one-minute slide of their research poster.*

Exhibitors & Research Posters

Ballroom A, Strand Union Building (SUB)

6:00 PM *Opening Remarks & Montana Optics Innovator Awards*
Joseph Shaw, Director, Optical Technology Center
Alison Harmon, Vice President for Research and Economic Development
SPIE
Optica
Thorlabs
Zygo
Jason Yager, Director, MPQA
Montana Department of Labor and Industry

Exhibitors

Altos Photonics	Montana Photonics & Quantum Alliance
CACI	nLight Defense Systems, Inc.
Edmund Optics	OptoSigma
Four9 Design	Quartus Engineering
Hawthorn Photonics	Shimadzu Scientific Instruments
ID Quantique	Shimadzu Scientific Instruments
Keysight Technologies	Spark Photonics Foundation
Keysight Technologies	SPIE
Lumibird Photonics USA, Inc	UpNano US, Inc.
MKS Newport	Zygo

Research Posters

Poster #	Abstract Title	Presenter
1	<i>Investigation of Tm³⁺ LiTaO₃ for integrated photonic quantum hardware</i>	Carter Gall
2	<i>High-pressure, air-independent combustion mechanisms: a real-time operando investigation using optical emission spectroscopy</i>	Dalton Forbes
3	<i>Probing PFAS-hemoglobin interactions using steady-state and time-resolved fluorescence spectroscopy</i>	Robin Das Sourab
4	<i>Probing Surface Redox in Yttria-stabilized zirconia (YSZ) Using Second Harmonic Generation and Raman Spectroscopy</i>	Shah Ali Haider Shanto
5	<i>Influence of SiO₂ Thickness on O₂ Adsorption at n-Doped Silicon Interfaces Probed by Second Harmonic Generation</i>	Debaleena Datta Gupta
6	<i>Temperature-Dependent Biomass Oxidation: Consequences for Combustion Emission Factors</i>	Kayode Fesomade
7	<i>Organo-Chromophore Functionalized Two-Dimensional Materials: Tuning spectral and spatial optical properties for energy transfer and single photon emission</i>	Tagert Mueller
8	<i>Single Particle Spectroscopy of Defects in Porphyrinic MOF Crystals</i>	Belief Rifore
9	<i>Precision Gravity Sensing with a Compact, Robust Atom Interferometer</i>	Christopher Siebor
10	<i>Precision beam steering for autonomous fiber coupling</i>	Zade Little
11	<i>Exciton diffusion dynamics in strain-localized WS₂ nanobubble quantum emitters</i>	Mohammad Soroush

Poster #	Abstract Title	Presenter
12	<i>A MEMS cantilever for strain tuning 2D materials in cryogenic conditions</i>	Nikolas Torgerson
13	<i>Gate-tunable spectroscopy of excitons and trions in monolayer MoSe₂</i>	Lucas Clouser
14	<i>Shaping the trap, sharpening the constant: A levitated approach to Big G</i>	Yateendra Sihag
15	<i>Levitated mirror interferometer</i>	Sophia Balderrama
16	<i>Workflow Development for Nano-Composite Fabrication Using 2PP</i>	Katerina Shabalin
17	<i>Quantum machine learning for galaxy data</i>	Emily Moss
18	<i>Transmission spectrum analysis of a silicon micro-ring resonator</i>	Gracie Brockie
19	<i>Arbitrary state manipulation of photonic qubits using liquid crystal retarders</i>	Grant Kirkland
20	<i>Development of an all-fiber polarization analysis module (pam) for network entangled photons</i>	Ector Ayala Diego
21	<i>Development of amplitude and phase modulation driver for control of quantum signal processor systems</i>	Ava Arbogast
22	<i>Optically addressable spin systems for quantum technologies: From defects to molecules</i>	Richard Escalante
23	<i>Evaluating hybrid photonic quantum-classical neural network architectures for nonlinear classification</i>	Rebekah Yager

Poster #	Abstract Title	Presenter
24	<i>Rydberg states in rubidium as a platform for quantum sensing of RF fields</i>	Luke Robins
25	<i>Optical Turbulence Generator for Testing Free-Space Optical Systems</i>	Rachel Tan
26	<i>Gimbal FSO link</i>	Hutchins Vujovich
27	<i>Auto Tensioning UAS Tether for Modular Free Space Optical Communication Nodes</i>	Ciaran Courtage
28	<i>Optical Phase-Locked Loop to Improve Laser Coherence Length</i>	James Broderick
29	<i>Synchronized Multi-LiDAR Sensing for Object Classification and Traffic Analysis</i>	Caleb Rohn
30	<i>Low-cost all-sky polarization imaging for aerosol characterization</i>	Morgan Hasenmyer
31	<i>Progress toward a low-cost, miniature downwelling irradiance sensor</i>	Adin Matthes
32	<i>Evolution of low-cost multispectral imaging systems for monitoring river water quality and characteristics</i>	Izzy Perez
33	<i>In-Flight UAV Detection Using a Miniaturized Wing-Beat Modulation Lidar</i>	Lars Johnson
34	<i>A preliminary laser-based, non-invasive biomolecule monitoring technique</i>	Christian Aitchison
35	<i>Underwater Wireless Optical Communications</i>	Garrett Kuntz
36	<i>Synthetic hyperspectral images for wildfire prevention</i>	Piper Hoxie

Poster #	Abstract Title	Presenter
37	<i>UAV-based multispectral optical sensing for AI-driven plant-level Potato Virus Y detection</i>	Muhammad Shehzore Hashmi
38	<i>Smart unoccupied system hyperspectral imager (SUSHI)</i>	Nathaniel Sweeney
39	<i>Single-sideband suppressed-carrier modulation on a photonic integrated circuit for lidar and communications</i>	Michael Menuey
40	<i>Development of a Field Deployable Optical Frequency Domain Reflectometer Based on Frequency Modulated Continuous Wave Lidar</i>	Mischa Gregory
41	<i>Exploration of lidar-enhanced sensing for autonomous UAS navigation in GNSS-denied environments.</i>	Owen Naberhaus
42	<i>Compositionally tuned thulium-doped mixed garnets for quantum signal processing applications</i>	Owen Wolfe
43	<i>Multichannel polarization-entangled photon distribution in a hybrid quantum-classical network</i>	Nathan Kuehl
44	<i>Building integrated photonics capabilities at MSU</i>	Corey Pearson
45	<i>Micro-scale 3D-printed light coupling elements for photonic integrated circuits</i>	Zachary Rice
46	<i>Aberration correction of an FSO system with 3D-printed fiber tip phase masks</i>	Thomas Ferrell
47	<i>Design, Fabrication, and Characterization of Fiber Tip Optics for Beam Steering</i>	Stetson Stocks
48	<i>Design and simulation of a silicon nitride ring-resonator sensor for cortisol detection</i>	Matthew Treaster

Poster #	Abstract Title	Presenter
49	<i>Auger depth profiling of nanoscale multilayers for deep-ultraviolet optical filters</i>	Phillip Tran