THE INSTITUTE OF OPTICS
INDUSTRIAL ASSOCIATES

April 3, 2025

HAJIM
SCHOOL OF ENGINEERING
& APPLIED SCIENCES
UNIVERSITY of ROCHESTER

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THE INSTITUTE OF OPTICS
HAJIM SCHOOL OF ENGINEERING & APPLIED SCIENCES
UNIVERSITY of ROCHESTER

SUMMER SHORT COURSES FOR BUSY PROFESSIONALS

Expand your knowledge with the courses below

Visit our website for descriptions, pricing, and registration

https://hajim.rochester.edu/optics/summer/index.html

Online

In-Person

Courses Offered

- Adaptive Optics in the Eye
- Alignment Intensive Optics Lab
- Applied Concepts
- Fundamental Concepts
- Integrated Photonics Circuits
- Laser Engineering
- Modern Optical Engineering
- Optical System Design
- Optical Thin Film Coating Technology
- Optomechanical Design, Assembly & Alignment
- Ultrafast Optics and Petawatt Laser Systems

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Agenda

Thursday, April 3rd — **Rochester Riverside Convention Center**

7:30 – 8:15 AM: Networking Breakfast
Riverside Court

8:15 – 8:45 AM: Welcome from The Institute of Optics
Tom Brown, Director and Professor
University of Rochester | The Institute of Optics
Lilac Ballroom

8:45 – 9:00 AM: Welcome from Rochester Institute of Technology
David Messinger, Professor
Rochester Institute of Technology | Center for Imaging Science
Lilac Ballroom

9:00 – 9:30 AM: Graduate Student Showcase
University of Rochester | The Institute of Optics
Lilac Ballroom

9:30 – 10:00 AM: Measuring 3D Molecule Orientation and 3D Polarization with a Microscope
Miguel Alonso, Professor of Optics
University of Rochester | The Institute of Optics
Lilac Ballroom

10:00 – 11:15 AM: Coffee Break/Poster Sessions
Foyer

11:15 – 12:00 PM: Company Connection Introductions
Lilac Ballroom

12:00 – 12:30 PM: Senior Design Showcase
University of Rochester Senior Class
Lilac Ballroom

12:30 – 1:30 PM: Networking Lunch
Lilac Ballroom

1:30 – 2:15 PM: Integrated Photonics at UR and RIT
Pablo Postigo Resa, UR; Stefan Preble, RIT; Jaime Cardenas, UR
Lilac Ballroom

2:15 – 2:30 PM: Optica and SPIE Student Chapter Updates
Trevor Shooshan, Optica Chapter President
University of Rochester | The Institute of Optics

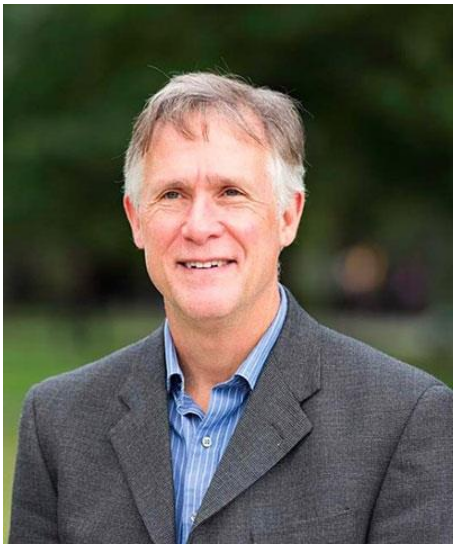
Robert Johnson, SPIE Chapter President
University of Rochester | The Institute of Optics
Lilac Ballroom

2:30 – 3:15 PM Women in Optics and Ice Cream Social
Riverside Court & West Corridor

3:15 – 5:30 PM: Company Connection Showcase
Highland Ballroom

5:30 – 8:00 PM: Networking Reception
Lilac Ballroom

The Institute of Optics Director's Remarks



Welcome to the Spring 2025 edition of The Institute of Optics Industrial Associates Symposium. The Institute has turned 96 years old and we are now actively looking toward the celebration of our centennial in 2029. Throughout the world, The Institute is viewed as a special place.

It is a special place for optics education. Our enrollment continues to stay strong, with over 60 students enrolled in our sophomore level courses and almost 60 first-year undergraduates. Professor Julie Bentley has over 60 students in her Lens Design course this year, a course that has grown to the point that she coaches an entire instructional team to maximize the amount of 1:1 time available to advise students on their projects. As a witness to Julie's instructional achievements, we also saw five students win honors in the annual Hilbert Optical Design Competition. Our MS Hybrid Optics Master's Education (HOME) program continues to grow, and the HOME labs have received glowing reviews. It was in recognition of her leadership in optics education that Professor Jennifer Kruschwitz was voted a Fellow of Optica.

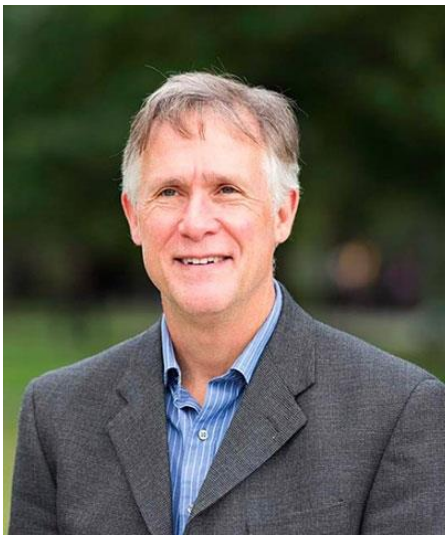
The Institute is also a special place for research. Professor William Renninger won a Presidential Early Career Award (PECASE); International research recognition went to Professor Susana Marcos (The Optica Edgar Tillyer award); Professor X.C. Zhang (The Optica Edwin Land medal); Professor Jannick Rolland (The SPIE A.E. Conrady award); and Professor Thomas Brown (The SPIE Stokes Award). We are the lead institution invited to submit a $160M, ten-year regional innovation engine proposal centered around the science, technology, and engineering of lasers and laser applications research (STELLAR). That proposal is in its final preparation stage. For companies that wish to discuss participation in STELLAR, there is still time to connect.

This year's symposium will feature a great lineup of senior design projects, many of which are being carried out for members of our community, poster sessions and presentations featuring student research and engineering projects, and extra time included for general networking. Faculty research presentations include both UR and RIT faculty presenting on integrated photonics and a feature presentation by Professor Miguel Alonso. As usual, the symposium will include the company showcase and a special Women in Optics gathering, followed by an evening reception.

I am especially thankful to each of our Industrial Associates members. Your support provides much-needed funding for supplemental teaching through adjunct faculty and upper-level graduate student support, outreach events to reach the next generation of students, travel scholarships to conferences, funding for student events, and funding for extra staff time to support it all. You are part of a fantastic community. Thank you!!!

Welcome

Welcome from The Institute of Optics



Thomas G. Brown

Professor and Director
The Institute of Optics | University of Rochester

Biography:

Thomas G. Brown is director of The Institute of Optics and is a Mercer Brugler Distinguished Teaching Professor at the University of Rochester. He also holds a secondary appointment as a senior scientist at the Laboratory for Laser Energetics. He has been on the faculty of The Institute since July of 1987, has held the rank of full professor since 2008, and is a Fellow of Optica and SPIE. He serves on the boards of the Luminate business accelerator, the New York Photonics Cluster, and the New York State photonics board, serves as chair of the annual multidimensional microscopy conference (Photonics West) and is the outgoing Editor-in-Chief of the Journal of Modern Optics. He was the founding director of the Robert E. Hopkins Center for Optical Design and Engineering, the architect of the optical engineering curriculum at the Institute of Optics, served as a program co-chair for the centennial program of Optica, and is former president and honorary member of the Rochester Local Chapter of Optica. He was foundational in establishing the plans for the Test, Assembly, and Packaging program within AIM Photonics and serves on the leadership council of AIM Photonics. He led the effort to establish the NSF-funded STELLAR regional innovation engine centered on advancing laser technology in the Rochester, NY region and serves as PI and interim CEO.

Welcome from the Carlson Center for Imaging Science

David Messinger

Professor and Xerox Chair

Biography:

Dr. Messinger received a BS in Physics from Clarkson University and a Ph.D. in Physics from Rensselaer Polytechnic Institute. He is currently a Professor and the Xerox Chair in Imaging Science at the Rochester Institute of Technology, having served as the Director of the Center for Imaging Science from 2014-2022. He is a Fellow of SPIE, serves as the co-Chair of the SPIE conference “Algorithms, Technologies, and Applications of Multispectral and Hyperspectral Imaging,” has published approximately 200 scholarly articles, and has advised over 30 students to completion of their MS and Ph.D. degrees. His research focuses on projects related to image system analysis and spectral image processing using advanced mathematical approaches with applications to remote sensing and cultural heritage imaging.

Graduate Student Speakers

Simulation of Water Waves Using Optical Design Software

Megan Fallon

Master's Student

Biography:

Megan Fallon is a second-semester MS student who will be graduating in May 2025. She obtained her BS in optical engineering from the University of Rochester last May. Her interests include lens design, fabrication, metrology, and optical interference coatings. During her senior year, she was a recipient of the Barnard prize, which is awarded to engineering students based on personal qualification and achievement. Megan has interned with QED technologies and MIT Lincoln Lab group 78 and is searching for a job upon graduation.

Understanding Cavity Modes for Quantum Electrodynamics: An Intuitive Approach

Michael Taylor

PhD Student

Biography:

Mike is a graduating NSF-GRFP Fellow and 5th year PhD Candidate in Optics, defending his thesis later this spring. He also completed his undergraduate studies at the Institute of Optics. He performs fundamental theoretical research on cavity quantum electrodynamics in Professor Frank Huo's group, investigating how light can be used to modify chemical reactions and solid-state phenomena. He has also done internships at Apple, Synopsys, Johns Hopkins APL, and Zygo during his studies.

Compensating for Primary Mirror Misalignment in a Sparse Aperture Interferometer

Jessica Steidle

PhD Student

Biography:

Jessica is an eighth-year PhD Candidate in Optics and will be defending her dissertation this fall. She earned her BA in Physics and Mathematics from the State University of New York at Geneseo. As part of Dr. Jannick Rolland's group, her research involves optical modeling, simulation, and aberration theory, investigating how pupil aberration theory can be leveraged in optical design. As part of her studies, she interned with the Air Force Research Laboratory's Sensors Directorate.

Faculty Talks

Measuring 3D Molecule Orientation and 3D Polarization with a Microscope

Miguel Alonso

Professor of Optics
Senior Scientist in the Laboratory for Laser Energetics

Biography:

Miguel Alonso is a Professor at The Institute of Optics and a Senior Scientist at the Laboratory for Laser Energetics. He also holds a position at Centrale Méditerranée and at the Institut Fresnel, both in Marseille, France. He is a Fellow of OPTICA and was the recipient of the 2023 G.G. Stokes Award in Optical Polarization from SPIE. He has served as Associate Editor of *Optics Express* and *Optica*, Deputy Editor of *Optics Express*, and is currently Editor-in-Chief of *Optics Letters*. His research is on various mathematical aspects of optics and physics.

Integrated Photonics at The University of Rochester and Rochester Institute of Technology

Harnessing AI for Integrated Photonics: Unlocking Limitless Applications

Pablo Postigo Resa

Professor of Optics
The Institute of Optics

Biography:

Professor Pablo Aitor Postigo Resa is a physicist specializing in nanophotonics, quantum photonics, semiconductor lasers, and biophotonics. He earned his Bachelor of Science in Solid State Physics from the University of the Basque Country in 1992 and completed his Ph.D. in Physics and Electrical Engineering at the Polytechnic University of Madrid. His doctoral research focused on developing optical monitoring techniques during the growth of III-V compounds by molecular beam epitaxy. Following his Ph.D., Professor Postigo Resa conducted postdoctoral research at the Massachusetts Institute of Technology (MIT), where he worked on integrating semiconductor lasers with high-density electronics on chips. After that, he researched photonic crystal lasers and solar cells at the CSIC in Madrid, Spain. In 2021, he joined The Institute of Optics as a Professor of Optics. His current research aims to achieve room-temperature quantum photonics by minimizing quantum decoherence, utilizing machine learning techniques to advance this field. Additionally, he collaborates with Professor Ben Miller from the University of Rochester Medical Center on developing chip-scale optical biosensors capable of detecting minute biological molecules, employing artificial intelligence to enhance detection sensitivity. Professor Postigo has been recognized with several awards, including a Fulbright Visiting Scholar position at Harvard University's Laboratory for Nanoscale Optics.

Photonic Integrated Circuits

Stefan Preble

Bausch and Lomb Professor
Rochester Institute of Technology

Stefan Preble is the Bausch and Lomb Professor in Microsystems Engineering at the Rochester Institute of Technology. His appointment is within the Department of Electrical and Microelectronic Engineering, Kate Gleason College of Engineering and he is also the Director of the Microsystems Engineering PhD Program. He received his BS in EE from RIT and PhD in ECE from Cornell University. He is an expert in Photonic Integrated Circuit (PIC) design, fabrication, testing, and packaging. His research is focused on the development of PICs for high-performance computing, communication, and sensing applications. He leads education initiatives for AIM Photonics, including the online course, “Photonic Integrated Circuits 1,” which has trained thousands on PIC design. He also leads AIM Photonics Testing & Packaging workshops and Hands-on Photonic Education Kits (HOPE) kits.

Elastic Averaging for Pluggable Photonics

Jaime Cardenas

Associate Professor of Optics
The Institute of Optics

Jaime Cardenas is an Associate Professor in The Institute of Optics at the University of Rochester’s Hajim School of Engineering. He holds a secondary appointment in the Department of Physics and Astronomy. Professor Cardenas earned his PhD in 2005 from the University of Alabama in Huntsville in Optical Science and Engineering, working on integrated photonics and microcantilevers in the group of Greg Nordin. He spent two years in the industry at Digital Optics Corporation in Charlotte, North Carolina. After being a postdoc and research scientist in Michal Lipson’s group at Cornell University and Columbia University, he joined the faculty of The Institute of Optics in 2016. Cardenas is an expert in integrated photonics and microfabrication. His current research interests are in advancing photonic packaging, time-varying photonics, nonlinear optics, AI-driven manufacturing photonics, and novel sensing modalities using photonics.

SPIE Student Chapter

SPIE is the International Society for Optics and Photonics. The University of Rochester Student Chapter was established in 2009 and has since grown to be the largest student chapter in North America, with over 70 registered student and alumni chapter members. We promote optical science and engineering while supporting the professional development of our chapter members. To accomplish this, we regularly engage in optics outreach in the Rochester community, invite speakers to visit with students on campus, and schedule tours of local optics companies.

Current Officers:

President: Robert Johnson
Vice President: Connor Hewson
Treasurer: Natalia Sanchez Soria
Secretary: Martín Sanchez

Internal Communications: Ganesh Petterson
External Communications: Rhett Wampler
Web Administrator: Matthew Belzer

If you would like to host a company tour or collaborate with us on outreach or professional development events, please contact urspie@gmail.com.

Optica Student Chapter

The University of Rochester's Optica student chapter is a pre-professional organization and academic club. Our mission is to promote and advance the science of light amongst the student body of the University of Rochester. One of our largest goals each year is to provide students with professional development opportunities aimed at giving them the skills they need to succeed. We have been working to find creative ways to engage with and teach optics to the campus and community at large, as well as host social events to promote interaction between students. Our biggest event of the year, bringing together Institute undergraduates, graduates, and faculty, is our annual Photon Cup soccer match with the Physics department.

President: Trevor Shooshan
Secretary: Jack Maness
Social Chair: Brendan Habert
Business Manager: Wonki Chae

Outreach Chair: Tate Finger
Senior Advisor: Farhan Ejaz
Digital Media Officer: Henry Chen

Please contact the chapter at RochesterStudentOSA@gmail.com if you are interested in getting involved in our chapter programming through outreach, event sponsorships, company tours, talks and/or presentations.

Posters

Yifan Bu, The Institute of Optics PhD (University of Rochester): Multi-Frequency Self-Imaging and Its Application on the Mid-Spatial Frequency (MSF) Error Metrology

Adam Cohen, Imaging Science MS (Rochester Institute of Technology): SAR Minimum Entropy Moving Target Imaging and Motion Parameter Estimation

Thomas Dickinson, Imaging Science PhD (Rochester Institute of Technology): Real Time 6DOF Satellite Pose Estimation from Resolved Ground Based Imagery with Deep Learning

Demetrious Dowdell, The Institute of Optics PhD (University of Rochester): Micro-Shear Calibration for Holographic Shearing Interferometry

Mohammad Hosseini, The Institute of Optics PhD (University of Rochester): Advancing Osteoporosis Pre-Screening: The Role of Portale Transcutaneous Raman Spectroscopy in Enhancing Early Detection

Evan James, The Institute of Optics PhD (University of Rochester): Optimization Strategy for Freeform Reflective Scheimpflug Systems

Haolin Liao, The Institute of Optics PhD (University of Rochester): Polarimetric Imaging of Peripheral Nerves

Akib Khan, Imaging Science MS (Rochester Institute of Technology): Robust Bayesian Vision Transformer for Image Classification

Zachary Manning, The Institute of Optics PhD (University of Rochester): Modifying the Refractive Index of Hydrogels in the Single Shot Limit

Ann-Christine Noll, The Institute of Optics Senior (University of Rochester): Impaired Scleral Growth and Myopia Development in a Retinal Degeneration Mouse Model

Yannis Nuzzolo, The Institute of Optics PhD Visiting Student (University of Rochester): Sag- and Slope-Orthogonal Cartesian Bases for Freeform Surfaces

Mohammad Saif, Imaging Science PhD (Rochester Institute of Technology): Evaluating Imaging Technologies for Precision Agriculture: Yield Prediction and Disease Assessment in Table Beets

Martin Sanchez, The Institute of Optics PhD (University of Rochester): Inverse Design of Bullseye Cavities Using Tandem Neural Networks

Lance Ulrich, The Institute of Optics Senior (University of Rochester): Development of TPP 3D Printed Calibration Targets for Light Sheet Microscopy

Jan Wasilewski, Imaging Science PhD (Rochester Institute of Technology): Understanding Deep Learning in Continual Learning

Yuchen Wu, The Institute of Optics PhD (University of Rochester): Multi-Material Gradient Index (MMGRIN) Design for Residual Aberration Correction

Yang Xu, Physics PhD (University of Rochester): High-Fidelity Spatial Information Transfer Through Dynamic Scattering Media by An ENZ Time gate

Xiaoran (Modric) Yue, The Institute of Optics Junior; Mathew McClure, The Institute of Optics PhD (University of Rochester): Spatial Degree of Unpolarization of Full Poincaré Beams

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SAVE THE DATE!

The fall symposium will be on Thursday, October 23, 2025