THE INSTITUTE OF OPTICS

INDUSTRIAL ASSOCIATES

Program & Resource Guide

Spring 2021

March 17 – March 19

HAJIM SCHOOL OF ENGINEERING & APPLIED SCIENCES

UNIVERSITY of ROCHESTER

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Message from the Director

Welcome to 2021 Spring Virtual symposium of the Industrial Associates!

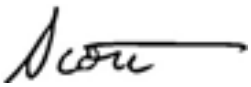
Thank you for participating and for your continuing support of the IA program and The Institute.

In the Fall of 2020 we reopened the university, offering in-person classes, getting back to the research that creates the discipline we all work in, doing our bit for a national recovery. And we know you all went back to work too. We know that because our students are getting hired and planning on internships and moving forward in their careers. Optics is once again the tall mast on a ship that drives our economy, expands the mind, and offers light in the darkness. I'm incredibly proud of my faculty, my staff and all of our IA partners.

In the summer of 2020, supposed experts in young adult behavior around the country were loudly predicting a total collapse of campus reopenings. They had good reason for pessimism. They predicted parties and irresponsible behavior would lead to superspreader events, massive outbreaks and campus shut-down. And, in some places, their predictions were borne out and those things happened. Not here. Not among Institute students, and not at UR. Our kids like a good party. Ask anyone who has attended an in-person IA meeting. But not this year. They wore their masks, kept their distance, washed their hands, and kept going to dedensified classes. Their commitment to the life of the mind and each other and our discipline was simply more important than the usual entertainments and diversions that have accrued to a college education. They are simply extraordinary. You should hire them. The Institute class of 2021 have demonstrated enormous amounts of character and resilience and leadership. Our IA partners always clamor to hire our students, but this year really is special, a proven vintage of students who will drive the recovery, leap to new discoveries and invent the future. You're going to want them doing that in your companies. I do.

Your participation in our IA program is greatly appreciated and we value your input. Thank you for being with us this Spring!

Meliora,



P. Scott Carney
Professor and Director, The Institute of Optics

SYMPOSIUM AGENDA

The Institute of Optics 2021 Spring Industrial Associates Symposium
Wednesday, March 17 → Friday, March 19, 2021

WEDNESDAY, March 17, 2021: *2:00PM – 5:00PM Eastern Time*

Meeting held virtually via REMO—link sent to you if registered in Eventbrite.

2:00 PM – Scott Carney, Professor & Director, The Institute of Optics
Topic: Welcome and Institute of Optics Update

2:15 PM – Kent Rochford, CEO and Executive Director of SPIE
Topic: SPIE Industry Update

2:30 PM – Tom Hausken, Senior Industry Advisor of OSA
Topic: OSA Industry Update

3:15 PM – Networking Break

3:30 PM – Katie Dunn, SPIE Student Chapter President and **Benjamin Nussbaum,** OSA Student Chapter President
Topic: Industry and Student Connections

3:45 PM – LaMar Hill, Office of the President, NY Creates
Topic: How NYS is forging the future of photonic, microelectronic, quantum, and AI technologies

5:00PM - 6:00PM: Networking Hour *(Optional)*

THURSDAY, March 18, 2021: *2:00PM – 5:00PM Eastern Time*

Meeting held virtually via **REMO—**link sent to you if registered in Eventbrite.

2:00 PM – Scott Carney, Professor & Director, The Institute of Optics
Topic: Welcome and Opening Remarks

2:15 PM – Sujatha Ramanujan, Managing Director, Luminate
Topic: From Lab to Launch: Building a successful business

2:45 PM – Master's Students Showcase
Featuring MS students presenting educational background, work experience, and career goals.
Note: They typically expect to graduate in May.

3:15 PM – Networking Break

3:30 PM – Graduate Students Research Talks
Featuring outstanding upper level Graduate Students presenting current project updates

4:30 PM – Dustin Froula, Prof of Physics, Distinguished Scientist, LLE
Topic: Spatiotemporal Pulse Shaping for Plasma Base Applications

5:00PM - 6:00PM: Networking Hour *(Optional)*

FRIDAY, March 19, 2021: *9:00AM – 3:00PM Eastern Time*

Meeting held virtually via **REMO—** link will be sent to you if registered in Eventbrite.

9:00 AM – Poster Session – via Zoom – link sent to you if registered for poster session in Eventbrite

11:00 AM – Scott Carney, Professor & Director, The Institute of Optics
Topic: Welcome and Opening Remarks

11:15 AM – Curtis Broadbent, Licensing Mgr, UR Ventures
Topic: Technology Transfer & Optics Intellectual Property Showcase Featuring Faculty IP

12:15 PM – Networking Break

12:30 PM – Company Introductions
Topic: IA company member representative(s) updates on contact info, open positions, interview opportunities

1:15 PM – Company Showcase *
Topic: IA company member representative(s) and student interaction for Q&A leading to formal interviews

Please note: IA companies will be in charge of scheduling virtual interviews directly with students. See résumés for contact details.

Any questions, contact: Lori Russell | lori.russell@rochester.edu

Register for the 2021 Spring Industrial Associates Symposium: https://2021-ia-optics-symposium.eventbrite.com

Pointers on using Remo

The IA Symposium is held through Remo, a virtual conference platform. Please use this link to access the event: https://live.remo.co/e/university-of-rochester-industri-2

If you have not already made a Remo account, you will be prompted to do so when accessing the IA Symposium. This takes only a couple minutes and does not need to be completed in advance.

After joining the event, you will be prompted to turn on your video & microphone. You can proceed without audio/video enabled, as well. Read and follow the directions as prompted to continue to the event.

- For Chrome users, you may need to select the lock icon next to the URL and enable access to your microphone and/or camera. If problems persist, try using an incognito page or clear your cache & recent browsing history, then reload & try again.

Upon entering the event, you will be placed at a random table on the virtual conference floor. You can use your microphone, video, and chat to communicate with people at your virtual table.

- Double click on available seats to move to different tables.
- Use the floor numbers at the far left to move to different floors for more tables
- Use the chat function to contact Kai Davies for assistance or to reach out to another attendee who is not at your table.

Most agenda items will take place using Presentation Mode. In presentation mode, all attendees join a single video meeting (much like Zoom). The Conference floor is not available during Presentation Mode.

- Use the Chat and Q&A functions to communicate with presenters and attendees
- If you are presenting, you will be “brought to the stage”, which makes you visible in the presentation.
- Mute your audio & turn off your video to remain unseen while awaiting your turn to present.

If you run into technical issues, try reloading your Remo page. Clearing your cache & recent browsing history or running Remo in an incognito window may resolve your issues.
You can also use the technical assistance button in the bottom left corner for assistance from the Remo team. They are very responsive and helpful, and typically respond immediately or within 5 minutes. You can also reach out to Kai Davies (from The Institute of Optics) via the chat for assistance during the event.

For a video demonstration of Remo, please use this link: https://drive.google.com/file/d/1qoAGIjftlK-i9LkxrmwFFkLx947VmHOU/view

To try out Remo prior to the event, you are welcome to use this Remo event, which will remain remain open continuously throughout the duration of the Spring IA Symposium:
https://live.remo.co/e/pre-ia-rehearsal-space

For questions or concerns in advance of the event, please email Kai Davies at kai.davies@rochester.edu.

The Industrial Associates Overview

Since 1929, The Institute of Optics has been providing industry with well-educated and trained B.S., M.S., and Ph.D. graduates. Many of these graduates go on to found important companies or to play significant roles in companies of all sizes. With approximately 3,400 Institute of Optics alumni, there is little doubt The Institute has made, and continues to make, major contributions to this country's Optics industry. But education is only part of the story. The Institute's faculty, staff, and students have a tradition of interacting with companies through research collaborations, consulting arrangements, in professional societies, and via a variety of other informal exchanges of ideas and information. The Industrial Associates ("IA") Program was conceived to provide a formal framework for maintaining and nurturing this historical relationship between industry and The Institute.

Resources are required for all research and educational programs, and income derived from the IA Program plays a critical role in the operation of The Institute of Optics. In addition to covering the costs of two annual meetings, IA Program membership fees are used for important expenditures for which other sources of funds are either insufficient or unavailable. The positive impact on our educational programs of the revenue derived from the IA membership fees is enormous. Two examples are graduate student recruiting and the purchase of specialized laboratory equipment. As most of our students take positions in industry upon graduation, recruiting the best students provides very direct and tangible benefits to companies. Likewise, exposing our students to state-of-the-art laboratory instrumentation is beneficial to industry. It is no exaggeration to say that the high quality of The Institute's graduates would Spring without a strong Industrial Associates Program.

The members of the Industrial Associates Program meet formally twice each year, usually in October and March or April. The format for each meeting is technical, featuring talks by IA member company representatives, guest speakers, faculty, graduate students and undergraduates. Luncheons with faculty, staff, and students, and an evening reception add a social dimension to each meeting. After our symposium, company representatives have a day to interview students, meet with faculty, visit research centers on the campus, or structure their day with the assistance of staff. Strategic and Select members may choose two days.

In 2014, on the 40th anniversary of the IA Program, the Director's Advisory Council (DAC) Meeting was introduced. These meetings are conducted in a format similar to a company's Board of Directors meeting, and they provide a formal forum for in depth discussion of The Institute's programs with its Director, faculty and the representatives of the strategic level Industrial Associates member companies. The first Council meeting in the Fall of 2014 was primarily a review of the restructuring of the IA Program membership levels and benefits. Each DAC meeting since has provided valuable review and planning.

At our Fall 2016 Symposium, we premiered a Company Connection Showcase following input from the DAC. It was such a success that for Spring 2017 we incorporated the Company Connection Showcase in a larger venue, which we continue to feature. Our DAC members provide crucial help with ongoing ABET accreditation requirements as an external Advisory Board as they did again at the Spring 2018 and 2019 meetings. Scott Carney initiated breakout focus sessions at our Fall 2017 DAC meeting. This format engaged members in lively discussion and generated further avenues for growth. Several DAC-generated initiatives in co-ops, campus engagement, and marketing are making an impact at The Institute. This IA meeting you will see a videographer capturing some key moments and testimonials from our members and our students – another DAC-driven idea.

Meliora!

IA Members & Levels

Industrial Associate members are listed alphabetically within membership levels: Strategic, Society & Trade Associations, Select, Standard and Associate.

STRATEGIC IA MEMBERS

ASML	**ASML** ***www.asml.com***
CORNING	**Corning Incorporated** ***www.corning.com***
DANBURY	**Danbury Mission Technologies** ***(formerly Collins Aerospace)*** ***www.dmtllc.org***
Edmund optics | worldwide	**Edmund Optics** ***www.edmundoptics.com***
L3HARRIS	**L3Harris Technologies (NY)** ***www.l3harris.com***
Experience | Solutions Newport mks	**Newport Corp | MKS Instruments** ***www.newport.com | www.mksinst.com***
OPTIPRO	**OptiPro Systems, Inc.** ***www.optipro.com/index.html***
SYNOPSYS®	**Synopsys** ***www.synopsys.com***
Zemax	**Zemax** ***www.zemax.com***
zygo®	**Zygo** ***www.zygo.com***

SOCIETY, TRADE, & ACADEMIC ASSOCIATION IA MEMBERS

Monroe Community College STATE UNIVERSITY OF NEW YORK	**Monroe Community College** ***www.monroecc.edu***
NEW YORK PHOTONICS PHOTONICS ROCHESTER	**New York Photonics** ***www.newyorkphotonics.org*** ***www.rrpc-ny.org***
nextcorps LUMINATE	**NextCorps | Luminate** ***www.nextcorps.org*** ***www.luminate.org***
OSA The Optical Society	**The Optical Society** ***www.osa.org***
SPIE.	**The International Society for Optics and Photonics** ***www.spie.org***

SELECT IA MEMBERS

AFRL THE AIR FORCE RESEARCH LABORATORY	**Air Force Research Lab (AFRL)** ***www.wpafb.af.mil/afrl/***
	Apple ***www.apple.com***

SELECT IA MEMBERS (Continued)

	**II-VI Inc.** *www.ii-vi.com*
	**L3Harris Technologies (CA)** ***www.l3harris.com***
	**Lawrence Livermore National Lab** *www.llnl.gov*
	**Lockheed Martin** ***(Missile & Fire Control and Space Systems)*** ***www.lockheedmartin.com***
	**MIT Lincoln Laboratory** ***www.ll.mit.edu***
	**Microsoft** ***www.microsoft.com***
	**Raytheon** ***www.raytheon.com***
	**Snap Inc.** ***www.snap.com***
	**Sunny Optical Technology Group Co., Ltd.** ***www.sunnyoptical.com***
	**Viavi Solutions** ***www.sunnyoptical.com***

STANDARD IA MEMBERS

Avo Photonics	**Avo Photonics** ***avophotonics.com***
facebook Reality Labs	**Facebook Reality Labs** ***www.facebook.com/careers/areas-of-work/facebookrealitylabs***
JANOS TECHNOLOGY	**JANOS Technology** ***www.janostech.com***
JENOPTIK Optical Systems	**JENOPTIK Optical Systems** ***www.jenoptik-inc.com***
NAVITAR	**Navitar** ***www.navitar.com***
Optikos The Optical Engineering Experts®	**Optikos** ***www.optikos.com***
OPTIMAX®	**OPTIMAX Systems, Inc.** ***www.optimaxsl.com***
QVI Quality Vision International Precision for People®	**Quality Vision International, Inc.** ***www.qvii.com***
SAFRAN Optics 1	**Safran | Optics 1** ***www.optics1.com***
SONY®	**SONY Electronics Inc.** ***www.sony.com***

ASSOCIATE IA MEMBERS

Bristol Instruments, Incorporated
www.bristol-inst.com

Gray Optics
www.grayoptics.com

Johns Hopkins Applied Physics Lab
www.jhuapl.edu

OptoSigma Corporation
www.america.optosigma.com/

Plymouth Grating Laboratory
www.plymouthgrating.com

Spica Technologies
www.toptica.com

TOPTICA Photonics, Inc.
www.toptica.com

Wavefront Research, Inc.
www.wavefrontresearch.com

Guest Speaker

Dr. Kent Rochford

CEO & Executive Director, SPIE

SPIE Industry Update

Kent Rochford is the CEO of SPIE, the international society for optics and photonics (Bellingham, WA). Representing over 19,000 members and serving more than 264,000 constituents from approximately 166 countries, the not-for-profit society advances emerging optics and photonics technologies through information exchange, continuing education, publications, and professional growth.

Previously, Rochford was the Associate Director for Laboratory Programs at the National Institute of Standards and Technology (NIST) and served as Acting NIST Director in 2017. He previously headed up NIST's Boulder Colorado Laboratory operations and the NIST Communication Technology Laboratory and was chief of the Quantum Electronics and Photonics Division and the predecessor Optoelectronics Division at NIST.

Rochford holds a PhD in optical sciences from the University of Arizona, a BS in electrical engineering from Arizona State University, and an MBA from the University of Colorado. Contact information: kentr@spie.org

Guest Speaker

Dr. Tom Hausken

Senior Industry Advisor, OSA

OSA Industry Update

With over 40 years in optoelectronics, Dr. Hausken focuses on industry content at OSA—The Optical Society. This includes OIDA (OSA Industry Development Associates, a trade association within OSA), where he also held a position earlier in his career. For 13 years until 2012, Dr. Hausken led market research and strategy consulting for lasers, image sensors, and a range of other photonic products at Strategies Unlimited. He was also a telecom policy analyst at the U.S. Congressional Office of Technology Assessment, and held R&D and production positions at Alcatel and Texas Instruments in photonics and electronics. He has a PhD from the University of California at Santa Barbara, in optoelectronics.

Guest Speaker

Katie Dunn

PhD Candidate in Optics
UR SPIE Student Chapter President

Industry and Student Connections

Katie Dunn is currently a PhD candidate in Andrew Berger's lab at the University of Rochester. Her research interests include computational microscopy and inverse light scattering, and her current work is on angular light scattering in single cells. Katie is currently the president of the SPIE student chapter at the University of Rochester, leading chapter initiatives in outreach, professional development, and diversity in optics. Katie holds a BS in Electrical Engineering and Physics from Clarkson University and an MS in Optics from the University of Rochester.

Guest Speaker

Benjamin Nussbaum

BS in Optics, anticipated '21
OSA Student Chapter President

Industry and Student Connections

Benjamin Nussbaum is currently an undergraduate senior at the University of Rochester. His research interests include partial coherence, quantum information, quantum optics, and integrated photonics.
Benjamin is currently the president of the OSA student chapter at the University of Rochester, leading efforts to engage students in professional development workshops, outreach opportunities, and social events. Benjamin has also served as a workshop leader and teaching assistant for several lab- and lecture-based optics courses.
Benjamin's combined efforts in teaching and student leadership were recently recognized when he was awarded an SPIE Optics and Photonics Education Scholarship in the spring of 2020. Benjamin will graduate in May with a BS in Optics, a BA in Physics and Astronomy, and a Minor in Mathematics from the University of Rochester.

Guest Speaker

LaMar A. Hill

Office of the President, NY CREATES

How NY is forging the future of photonic, microelectronic, quantum, and AI technologies

LaMar Hill recently joined the SUNY Research Foundation in the NY CREATES President's office. For the past two decades, Mr. Hill has been a leader of New York's Tech Valley and Mohawk Valley regional economic development teams, specializing in global business development in advanced electronics. These initiatives led to the decision by GlobalFoundries (formerly AMD) to build a $12+B manufacturing campus at the Luther Forest Technology Campus in Malta, New York and CREE to build a high volume SiC device manufacturing fab at the Marcy Nanocenter site near Utica, NY. In this role, the initiatives Mr. Hill has been involved in have created more than 15,000 direct jobs and can be expected to create an additional 20,000-25,000 jobs over the next ten years. Accelerating technology commercialization has been the focus of Mr. Hill's activities for the past thirty years.

These activities have included joint development activities with Universities, multi-million dollar R&D programs in defense/aerospace, tech transfer and acquisition, and development of successful R&D funding strategies with programs such as SBIR, STTR, ATP and TRP. In addition, LaMar has been a trusted business strategist, including securing debt and equity financing packages, corporate management of software and technology development organizations and the acquisition of several product lines.

Mr. Hill received a BS degree in Chemistry from Kalamazoo College and an MS degree in Chemistry from UCLA. In 2004, Mr. Hill was selected by Small Times Magazine (primary global nanotechnology business publication) as one of the Global Nanotech Advocates of the Year.

Guest Speaker

Dr. Sujatha Ramanujan

Managing Director, Luminate

From Lab to Launch: Building a successful business

Dr. Sujatha Ramanujan is a serial entrepreneur and seasoned executive with 25 years of experience in Clinical Devices and in Consumer Electronics. Dr. Ramanujan holds a PhD in Electrical Engineering from the University of Michigan, and has started, built, and grown three startup businesses. Sujatha has held scientific, technical leadership, and executive positions in Chrysler Corporation, GE, Kodak, Carestream, and Intrinsiq Materials. She holds 28 issued US patents. As a corporate investor for Kodak, then later working with regional investment councils, she provided guidance to startups, and M&A strategies.

Sujatha is currently the Managing Director of the Luminate Accelerator, an investment fund and educational program under NextCorps. Luminate has the privilege of investing in and advancing 30 photonics companies and bringing them to the Rochester area. Of the 30 companies sponsored by Luminate, approximately one third are minority- and women-led businesses, a number she hopes to see improve.

Sujatha's community service efforts are focused on providing recognition and professional advancement for women. She was a Board Member of the National Women's Hall of Fame and served as induction chair. She is also actively involved in the Indian community and in educational programs in dance, science, and literacy.

Guest Speaker

Dr. Dustin Froula

Professor of Physics, Distinguished Scientist, LLE

Spatiotemporal Pulse Shaping for Plasma Base Applications

Dr. Dustin Froula is an Associate Professor of Physics and a Distinguished Scientist at the LLE. After working as a research scientist at the National Ignition Facility Inertial Confinement Fusion Directorate at Lawrence Livermore National Laboratory for nearly 10 years, he spent a year on sabbatical at the University of California, Los Angeles where he completed the book, Plasma Scattering of Electromagnetic Radiation.

He then joined the research staff at the Laboratory for Laser Energetics (LLE) as a Senior Scientist before becoming the Plasma and Ultrafast Physics Group Leader in 2011. In 2007, he received the Department of Energy's Outstanding Mentor Award for his work with undergraduate and graduate students. He was selected as a fellow of the American Physical Society in 2017. In 2019 he was awarded the John Dawson Award for Excellence in Plasma Physics Research and this year he received the Ernest Orlando Lawrence Award in fusion and plasma sciences, partially for the work that he will discuss today.

Guest Speaker

Dr. Curtis J. Broadbent

Licensing Manager, UR Ventures
Assistant Professor Part-Time
Rochester Theory Center, Center for Coherence and Quantum Optics, and Department of Physics and Astronomy at The University of Rochester

Technology Transfer & Optics Intellectual Property Showcase Featuring Faculty IP

Curtis Broadbent is an assistant professor (part-time) in the Department of Physics and Astronomy at the University of Rochester. He was most recently a post-doctoral research associate in Joe Eberly's research group in theoretical quantum optics (Eberly Research Group), also at the University of Rochester. He is currently investigating non-Markovian effects in open quantum systems, measures of genuinely multipartite entanglement, entropic steering inequalities, quantum state discrimination, long-distance quantum key distribution, and weak measurements.

Curtis graduated in August of 2010 from John Howell's experimental quantum optics research group (Howell Research Group) in the Department of Physics and Astronomy. While in John's group, he worked on projects related to quantum image discrimination, slow light with entangled photons and pseudo-thermal light, and applications of bipartite photonic entanglement to quantum cryptography. Additionally, he collaborated with Andrew Jordan's research group (Jordan Research Group) on an experimental and theoretical investigation into non-local weak-value measurements.

Curtis completed his undergraduate degree at Brigham Young University with a B.S. in Physics in 2003. At Brigham Young University, he worked with Scott Glasgow and Justin Peatross on dynamical notions of energy loss and irreversibility in phenomenologically modeled dielectric/field systems.

Email: curtis.broadbent@rochester.edu

Graduate Student Showcase & Research Talks

This part of the program features presentations by candidates for Master's and Ph.D. Degrees and will speak to their experience, research/abstract topics, and other highlights.

MS Showcase

MS Students seeking internships & post-graduation employment

MS Showcase (Continued)

MS Students seeking internships & post-graduation employment

Emma Foley

efoley4@ur.rochester.edu

Education Highlights

University of Rochester

- **M.S. in Optics – Expected May '22**
  - Specializing in optical design, fabrication, and testing
- **B.S. in Biomedical Engineering, High Honors – May '20**
  - Concentration in medical optics

Work Experience

- **Collins Aerospace | *Optical Engineering Intern; Fall Co-Op*** (Jun '20 – Current)
  - Optical design/analysis - deep space optics
  - Stray light test device design, assembly, alignment, and operation
- **Clerio Vision, Inc | *R&D Engineering Intern*** (Jun – Aug '19)
  - Femtosecond laser system alignment and optimization
  - Precision metrology, tissue handling, experimental test design
- **Center for Visual Science, Hunter Lab | *Research Assistant*** (Dec '17 – May '19)
  - Advanced biomedical imaging (two-photon adaptive optics fluorescence lifetime ophthalmoscopy)
  - Image processing, statistical analysis, vision science

Objectives

- **Seeking careers in optical design, fabrication, or testing in any field of optics**

Nicole Naselaris

Education Highlights

- MS in Optics expected Dec '21
- BS in Opt Eng, University of Rochester

Work Experience

- Research Asst, Prof. Wayne Knox Lab - 2019
- Research Asst, Optical Diagnostics & Appl. Lab – 2019
- Opt. Engg. Intern, FluxData Inc – 2018
- Opt. Engg. Intern, Zygo Corp – 2017
- Metrology & Quality Control Intern, Sydor Optics - 2016

MS Showcase (Continued)

MS Students seeking internships & post-graduation employment

Ashley Pruett

Education Highlights

At Missouri S&T:

-B.S. Physics

-Minor in Mathematics

-Minor in Philosophy of Technology

At University of Rochester:

-M.S. Optics

Work Experience

- Measured the noise floor of a Michaelson Interferometer

Objectives

- I am seeking a full-time position following graduation in May.

Christian Tolfa

Education Highlights

- M.S. in Optics, May 2021. B.S. in Optical Engineering, May 2020 from U of R
- Courses in Advanced Lens Design, Optical Materials, Illumination, Lasers, Color
- Proficient in CodeV, LightTools, MATLAB, Lumerical

Work Experience

- Worked at LLNL in 2020 developing MATLAB GUIs and Lumerical scripts to analyze effects of biochemicals on WGMs
- Worked at L3Harris on a research and development project related to satellites

Objectives

- Looking for a post-grad position in lens design, material engineering or optical engineering

MS Showcase (Continued)

Post-Co-op MS Student

For more information on hiring Co-op students, contact Kai Davies (Graduate Program Coordinator) at kai.davies@rochester.edu.

PhD Research Talks

Arturo Canales-Benavides

Advisor: Prof. Scott Carney

Development of Quantum Dots for Efficient Light Emission at Telecom Wavelengths

Marissa Granados Baez

Advisor: Prof. Jaime Cárdenas

Integrated Photonics and 2D Materials

William Hughes

Advisor: Prof. Gary Wicks

Development of Quantum Dots for Efficient Light Emission at Telecom Wavelengths

PhD Research Talks (Continued)

Gregory Jenkins

Advisor: Prof. Jake Bromage

Overcoming High Energy Limitations with Divided Pulse Nonlinear Compression

Liangyu Qiu

Advisor: Prof. Nick Vamivakas

Towards the Next Generation of Efficient Light Sources

Poster Session

Each Industrial Associates meeting features a kaleidoscope of posters providing a seasonal glimpse into the research projects of The Institute of Optics. Each individual poster will have a separate Zoom link. Please use the links & join details below to access each poster presentation.

Xue Dong

Stretched-pulse soliton Kerr resonators

Abstract: Ultrashort pulses of laser light are an essential tool for the physical and life sciences, with major impact for example in processing materials, in tele-communications and for biomedical applications including eye surgery and for imaging deep into the brain. This research establishes a powerful new technique for generating ultrashort pulses from a simple and robust optical fiber system. Traditional sources of ultrashort light pulses from “mode-locked” lasers are limited in wavelength by the specific laser gain material used to generate the light. This new system can generate ultrashort pulses without the gain material in a simple optical cavity. This study establishes the shortest pulses to date from a fiber cavity without a laser gain. This advance is enabled by an exciting new type of optical wave known as a soliton, which is an envelope of light that remains confined or stable over extended propagation. This new type of soliton stretches and compresses periodically in the fiber cavity, giving it the name ‘stretched-pulse soliton”. The stretched pulse soliton, which is fully characterized theoretically and experimentally in our research report [1], enables a versatile new femtosecond source of light and may stimulate new advances for the nonlinear waves, photonics, frequency comb, and laser communities.

Zoom:
https://rochester.zoom.us/j/93457649656?pwd=a3FBRWpubysxcDYzS1FvZlhEWVlHZz09
Meeting ID: 934 5764 9656
Passcode: 131779

Poster Session (continued)

Arturo Canales Benavides

Cross-correlation interferometric synthetic aperture microscopy (CCC-ISAM) for full-range, high-resolution Fourier-domain optical coherence tomography

Abstract: CC-ISAM is a synthetic-phase modulation method in combination with an ISAM-based reconstruction algorithm that provides full-range, high resolution, 3D imaging to data acquired by means of Fourier-domain OCT. This is accomplished by solving an OCT inverse scattering problem that takes into account the effect of a sinusoidal synthetic-phase reference encoded into the 3D interferometric data. We will present numerical simulations and proposed optical setup.
Zoom:
https://rochester.zoom.us/j/92753342166?pwd=U1p4bDlQemFjUlFPMjlrNUVPb1pQZz09
Meeting ID: 927 5334 2166
Passcode: 254600

Marissa Granados-Baez

Integrated Photonics and 2D Materials

Abstract: We demonstrate room temperature lasing of monolayer WSe_2 integrated with a silicon nitride ring resonator. The monolayer, microring platform enables monolithic, on-chip, waveguide coupled light emission.
Zoom:
https://rochester.zoom.us/j/95336062425?pwd=ODhZTE9VTjhnTUIzaW9SbWp5YjVYQT09
Meeting ID: 953 3606 2425
Passcode: 792644

Poster Session (continued)

Xiaotong He

Electrically induced optical frequency shifts of laser light using an array of ring resonators

Abstract: We are working on a brand-new method to change the frequency of light after its emission from laser by applying an electrical signal to an array of ring resonators. Such a novel device will get rid of an optical pump or a gain medium in nonlinear frequency conversion.
Zoom:
https://rochester.zoom.us/j/98694192181?pwd=WVRBOEYyMTErWFI4WnJ1MjhtenlpZz09
Meeting ID: 986 9419 2181
Passcode: 622257

Nicholas Kochan

Mapping a GRIN profile using confocal Raman Spectroscopy

Abstract: Scanning confocal Raman microscopy is proposed to measure a gradient index (GRIN) profile at an optical surface. The measurement procedure is outlined for mapping Raman spectrum to index of refraction, and factors to maintain precision of this mapping are discussed. Results suggest that the mapping method is a faster nondestructive way to measure the GRIN profile of a GRIN lens and its positioning within the lens geometry, to within the sampling precision of the Raman microscope.
Correspondence: nkochan@u.rochester.edu
Publication with supporting information: https://doi.org/10.1117/1.OE.59.11.112605
Zoom:
https://rochester.zoom.us/j/96423302404?pwd=NmJQMXFYcmViS1ZhRVlHcUhlT2NBQT09
Meeting ID: 964 2330 2404
Passcode: 329678

Poster Session (continued)

David Lippman

Prescribed Irradiance with Freeform GRIN

Abstract: Generating a prescribed irradiance distribution given a source distribution is an inverse problem that sits at the heart of illumination design. The growing prevalence of freeform optics has inspired several design methods for obtaining a prescribed irradiance distribution possessing no symmetry. Up to now, these methods have relied exclusively on freeform optical surfaces for generating freeform irradiances. This paper presents a design method that, for the first time, applies gradient-index (GRIN) optics to solving this inverse problem. Using a piecewise-continuous freeform gradient-index (F-GRIN) profile, a single optic with two planar surfaces can be designed to produce a far-field prescribed irradiance distribution from a point source. The design process is herein presented along with two design examples which demonstrate some of the unique properties of F-GRIN illumination optics.
Zoom:
https://rochester.zoom.us/j/95375923310?pwd=STBlb2tRMWIzbjFQbTdtd2RsRUVuZz09
Meeting ID: 953 7592 3310
Passcode: 485063

Juniyali Nauriyal

Single-shot, Multiple I/O Photonic Chip to Fiber Array Packaging Using Fusion Splicing

Abstract: One of the remaining challenges to achieve manufacturing scalability of silicon nanophotonic devices is a low cost, highly efficient, and mechanically robust method to optically couple multiple optical fibers to a photonic chip at once. We show a novel multiple I/O photonic packaging method for 4 fiber array using fusion splicing. We demonstrate a minimum loss of 2.0dB per facet with a variation of +/-0.1dB through a 4-fiber array.
Zoom:
https://rochester.zoom.us/j/93559449094?pwd=YW5kd0kyNzZmdk54bHhhOW9lbENDQT09
Meeting ID: 935 5944 9094
Passcode: 192137

Poster Session (continued)

Meiting Song

Enhanced on-chip phase measurement by weak value amplification

Abstract: Weak value amplification enhances signal without amplifying noises such as shot noise and 1/f noise. Achieving weak value amplification with integrated photonics devices adds compatibility and stability to ultrasensitive measurements. We demonstrated 9dB signal enhancement with on-chip device using inverse weak value amplification over a standard Mach-Zehnder interferometer with equal detected power.

Zoom:
https://rochester.zoom.us/j/97027733032?pwd=OGR1TEdZS3RWancvNkVSUnhxRFpHZz09
Meeting ID: 970 2773 3032
Passcode: 475586

Yi Zhang

Engineered Second-order Nonlinearity in Silicon Nitride

Abstract: Silicon nitride (Si3N4) is a low-loss, CMOS-compatible material that has revolutionized many fields including integrated optics and nonlinear optics. So far, however, its application in limited because it lacks an electro-optic response. We present an approach to build permanent second-order nonlinearity in Si3N4 by electrically aligning the Si-N bonds, which are usually oriented in random, and demonstrate non-trivial electro-optic modulation in >10GHz regime. This work will create a powerful photonic platform for silicon photonics and quantum optics.

Zoom:
https://rochester.zoom.us/j/96973567632?pwd=Vm5ZOUNLRFVLeEo2ZkFTRlNoZlhIdz09
Meeting ID: 969 7356 7632
Passcode: 290919

The Institute of Optics Overview

It is the fate of higher education to be in a state of endless evolution. Prior to approximately 1850, colleges in the U.S. focused for the most part on the classical curriculum: ancient languages, mathematics, natural philosophy, chemistry, and moral philosophy. Over time, more specialized and practical degree programs such as business, education, science, and engineering were developed to meet the needs of a changing world. In science, the University of Rochester was an early innovator, being one of the first institutions in the U.S. to form science departments and to award the degree Bachelor of Science. One particularly prominent Rochester innovation was the founding in 1929 of The Institute of Applied Optics, the name of which was shortened in 1939 to The Institute of Optics. Now, more than six decades later, the boldness and wisdom of that move were never clearer. Who could have foreseen in 1929, more than thirty years before the demonstration of the first laser and more than forty years before the demonstration of the low-loss optical fiber, the rich and vibrant field that optical science and engineering would become!

Today, The Institute of Optics is the preeminent program of higher education in Optics in the United States. The first such program in the U.S., The Institute granted the nation's first B.S. degree in Optics to Arthur Ingalls in 1932, the first M.S. degree in Optics to Perley Nutting, Jr. in 1938, and the first Ph.D. in Optics to Wayne McKusick in 1940. Originally a stand-alone academic unit of the University of Rochester, The Institute is now an internationally recognized academic department within the university's Hajim School of Engineering and Applied Science.

Former Directors include several OSA Presidents, two university Provosts and a Director of the White House Office of Technology Policy. Other faculty and former faculty occupy similar prominent positions in professional societies, industry and the optics community in general.

The Institute of Optics features a distinguished interdisciplinary faculty made up of physicists, applied physicists, materials scientists and engineers, and a student body consisting of 170+ undergraduate majors pursuing the B.S. degree in Optics and 125+ graduate students pursuing the M.S. or Ph.D. in Optics. The early history of The Institute of Optics is graced with the names of such prominent Rochesterians as George Eastman, Edward Bausch, Rudolf and Hilda Kingslake, and Brian O'Brien. In later years, such men as Robert Hopkins and Brian Thompson helped advance The Institute's reputation.

The size of The Institute's faculty currently stands at 18 professors with full-time appointments; 13 professors with secondary Optics appointments from diverse departments such as imaging sciences, physics, dermatology, electrical and computer engineering, Laboratory for Laser Energetics, and chemistry; 11 adjunct professors and lecturers, 2 senior scientists; 20+ professional personnel, including research scientists, and post-doctoral scientists, etc.; and 8 full time staff members.

Optics is defined very broadly at Rochester, ensuring that students can select from a broad range of research fields. The faculty maintain research programs in laser physics and engineering, optical system design, optical detector, semiconductor lasers, electronic imaging, diffractive optics, fiber optics, nonlinear optics, quantum optics, optical materials, guided-wave optics and optoelectronics, theoretical foundations of optics, ultrafast phenomena, gradient-index optics, the precision manufacturing of optical elements, applications of holography, wave propagation, medical optics, image processing and wave front sensing, high-intensity laser-matter interactions, nano-optics, and biomedical optical systems, optical instrumentation, and system engineering.

After completing the degree, Ph.D. graduates of The Institute of Optics take positions in large and small companies, on the faculties of research universities and liberal arts colleges, and in federal laboratories.

At Rochester, The Institute of Optics strikes a balance between engineering and basic science. In teaching and research, the Optics program spans the continuum between the fundamental and the applied. Students intending to do very basic research are nevertheless required to understand such practical matters as radiometry and aberrations in lenses. Students intending to do more applied research are likewise required to take courses of a fundamental nature. The objective is to produce graduates who not only are broadly educated in the field of optics, but also respect the importance of the full spectrum of subfields.

The most serious issues facing graduate education in optics today are no different than those facing graduate education in science and engineering in general. One serious challenge is to maintain the willingness of young men and women to pursue technical graduate degrees of any sort. Another is to make sure that our citizens understand the importance of research in modern society. As a field, optical science and engineering can hold its own. It is an interesting, challenging, relevant, and intimate field, one in which it is still possible to do important work in a setting of modest size. Communicating to the general public that its future standard of living, and that of its children, depends in a very real way on today's investments in research is as important now as it has ever been. If that challenge can be met, then the future of optical science and engineering will be a bright one.

Undergraduate Course of Study

The Institute of Optics is a distinct academic department, originally established in 1929 for undergraduate education in optical science and engineering. While we at the Institute incorporate much more research and graduate education into our activities than was the case in the early 20th century, undergraduate education remains a central focus. By choosing appropriate technical electives and a design project/thesis students can complete a degree in optical engineering or optics.

The basic elements of this demanding degree are annotated on the next page. The required optics courses are carefully designed to span the most significant areas in classical and modern optics. In addition, we have a Technical Elective Cluster consisting of 12 credits worth of courses allowing students to specialize in areas such as lens design, electron microscopy, thin films, biomedical optics, or any technical theme approved by the student's faculty advisor. Undergraduates are encouraged to gain technical experience through paid laboratory research, summer research (e.g. REU) programs, industrial employment and internships, and senior-level honors research.

With a history of more than 90 years, the optics B.S. program is well known by the optics industry as a producer of highly educated and well-rounded students. The career choices of our undergraduates include advanced degree work leading to MS-level optical design and engineering, doctoral research leading to teaching, research, and corporate leadership, technical support and marketing, patent law, business management and a host of entrepreneurial activity.

The B.S. degree in Optics (OPT) or Optical Engineering (OPE) consists of a minimum of 130 credit hours of coursework. Please note: The first three years are virtually identical for students pursuing either degree (all courses carry four credits unless otherwise indicated).

A description of all Optics courses may be found on the Optics webpage:

http://www.optics.rochester.edu/undergraduate/courses.html

Undergraduate Course of Study

Year	Fall Courses	Spring Courses
Year 1: Freshman ***~30 Credits***	**MATH 161 Calculus I** **CHEM 137 Chemistry for Engineers** **WRTG 105* College Writing or Cluster course** **OPT 101 Introduction to Optics** ***(recommended)***	**MATH 162 Calculus II** **PHYS 121 Mechanics** **OPT 211 MATLAB for Optics Majors I (2cr.)** **WRTG 105* College Writing or Cluster course**
Year 2: Sophomore ***~36 Credits***	**OPT 241 Geometrical Optics** **OPT 201 Geometrical Optics Lab (2cr.)** **MATH 164 Multidimensional Calculus** **PHYS 122 Electricity and Magnetism** **Cluster course or tech elective**	**OPT 261 Interference & Diffraction** **OPT 202 Physical Optics Lab (2cr.)** **OPT 287 Math Methods for Optics and Physics** **PHYS 123 Waves and Modern Physics** **Cluster course or tech elective**
Year 3: Junior ***~32 Credits***	**OPT 242 Aberrations & Testing** **OPT 203 Aberrations & Testing Lab (2 cr.)** **OPT 262 Electromagnetic Theory** **MATH 165 Linear Algebra w/ Diff. Equations** **OPT 212 MATLAB for Optics Majors II (2cr.)**	**OPT 225 Sources and Detectors** **OPT 204 Sources/Detectors Lab (2cr.)** **ECE 210 Circuits for Engineers** **WRTG 273 Communicating your Professional Identity** **OPT 223 Quantum Theory**
Year 4: Senior ***~32 Credits***	**B.S. in Optics (OPT)** **OPT 320 Senior Thesis I** **Cluster, Tech, or free elective x 3** **B.S. in Optics (OPE)** **OPT 310 Senior Design I** **Cluster, tech, or free elective x 3**	**B.S. in Optics (OPT)** **OPT 321 Senior Thesis II** **Cluster, tech, or free elective x 3** **B.S. in Optics (OPE)** **OPT 311 Senior Design II** **Cluster, tech, or free elective x 3**

*Students not enrolled in **WRT 105** in the Fall should take cluster course #1. Students enrolled in **WRT 105** in the Fall should take cluster course #1 in the Spring.
**Note: Students many elect to take 16 credits during Freshman Spring semester (16 credit minimum is required to be eligible for Dean's List).

Master's Program Course of Study

http://www.optics.rochester.edu/graduate/ms.html#standard

There are three basic ways to earn the M.S. degree. The first involves completing six graduate-level Optics courses and a thesis, a program that typically requires two years to complete. The second requires completing eight courses and writing a paper based on literature research, a program that can be completed in a single year. The third, also a non-thesis option, is an M.S. Co-Op program, in which a one-year work-period in industry is inserted between the two required semesters of coursework, making it a two-year program overall. Between 1988 and 2020, The Institute placed 91 M.S. students in one-year Co-Op slots in 23 companies.

A typical set of courses taken by students enrolled in either of the non-thesis M.S. options appears in the table below. Four of the eight courses are required (req.), the remaining four are electives. Examples of alternative choices are Optical Thin Film Coatings, Guided-Wave Optics, Biomedical Optics, and Lens Design, among others. Another version of the non-thesis route allows the M.S. student more opportunity to concentrate in a specific sub-field of Optics.

Interest in the M.S. degree program remains high among both students and employers. The typical M.S. applicant holds a B.S. degree in Physics, Electrical Engineering, or Optics, but it is not uncommon for those holding M.S. degrees in Physics or Electrical Engineering, or even doctorates in allied fields, to apply for admission to the Optics M.S. program. In recent years, The Institute has admitted M.S. applicants holding Ph.D.'s in Physics from MIT, Stanford, and Purdue, and one with a Ph.D. in Physical Chemistry from Johns Hopkins. No matter what a student's educational background is, the M.S. Degree in Optics is a professional credential that identifies the graduate as a bona fide optical engineer.

Fall Courses	Spring Courses
Wave Optics and Imaging (req.)	Detection of Optical Radiation (req.)
Foundations of Modern Optics (req.)	Optics Laboratory (req.) or Elective
Optics Laboratory (req.) or Elective	Elective
Elective	Elective

Optics is defined very broadly at Rochester, ensuring that students can select from a broad range of research fields. The faculty maintain research programs in laser physics and engineering, optical system design, optical detector, semiconductor lasers, electronic imaging, diffractive optics, fiber optics, nonlinear optics, quantum optics, optical materials, guided-wave optics and optoelectronics, theoretical foundations of optics, ultrafast phenomena, gradient-index optics, the precision manufacturing of optical elements, applications of holography, wave propagation, medical optics, image processing and wave front sensing, high-intensity laser-matter interactions, nano-optics, and biomedical optical systems, optical instrumentation, and system engineering.

Doctoral Program Course of Study

http://www.optics.rochester.edu/graduate/phd.html

The Institute of Optics has separate admissions processes for the M.S. and Ph.D. programs; admission to the M.S. program does not confer admission to the Ph.D. program, nor is the M.S. required to earn the Ph.D. For the last fifteen years, The Institute has enrolled approximately 16 Ph.D. students each year from a pool of applicants that numbers in the hundreds. In any given year 55 – 65% of the students admitted are U.S. citizens.

Ph.D. students take a common set of seven core courses, plus one elective in their first year (except in cases where a student's previous coursework argues for a change).

Year 1: Fall Courses	Year 1: Spring Courses
Physical Optics (Fourier Optics) (req.)	Electromagnetic Theory (req.)
Geometrical Optics (req.)	Instrumental Optics (req.)
Radiation and Detectors (req.)	Quantum Mechanics (req.)
Mathematical Methods (req.)	Fundamentals of Lasers

Second-year Ph.D. students combine more specialized courses that aim to prepare them for research with two semesters of service as teaching assistants (mandatory). Any remaining courses are taken in the third year, but most of the third year and beyond is devoted to research. The time required to complete the Ph.D. depends on the student's interaction with his or her adviser and thesis committee. With their guidance, the student is assured of steady progress and beneficial advice.

Year 2/3: Fall Courses	Year 2/3: Spring Courses
Quantum Electronics I, II Nano-Optics	Lens Design Medical Imaging
Advanced Lens Design Optical	Optical Properties of Materials
Communications Optical Fabrication & Testing Biomedical Optics	Principles of Eye Design
Electronic Imaging Systems	Quantum Optics
Waveguide Optoelectronic Devices	Optics Laboratory Advanced
Optical Interference Coatings	Optical Coatings Polarization
Nonlinear Optics	Technical Entrepreneurship

Doctoral Program Course of Study (Cont'd)

Optics is defined very broadly at Rochester, ensuring that students can select from a broad range of research fields. The faculty maintain research programs in laser physics and engineering, optical system design, optical detector, semiconductor lasers, electronic imaging, diffractive optics, fiber optics, nonlinear optics, quantum optics, optical materials, guided-wave optics and optoelectronics, theoretical foundations of optics, ultrafast phenomena, gradient-index optics, the precision manufacturing of optical elements, applications of holography, wave propagation, medical optics, image processing and wave front sensing, high-intensity laser-matter interactions, nano-optics, and biomedical optical systems, optical instrumentation, and system engineering.

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The Institute of Optics Directory

Faculty

The subsequent pages list each faculty member alphabetically with his or her contact information and website (as available). *Click on name for short biography and research overview / abstract.*

Agrawal, Govind P.

James C. Wyant Professor of Optics
Professor of Physics
Senior Scientist, LLE
gpa@optics.rochester.edu | **(585) 275-4846**
515 Goergen Hall
Website

Interests: Fiber Optics; Lasers; Optical Communications

Alonso, Miguel A.

Professor of Optics
alonso@optics.rochester.edu | **(585) 275-7227**
213 Wilmot Building
Website

Interests: Mathematical Models of Wave Propagation

Bentley, Julie

Associate Professor of Optics
bentley@optics.rochester.edu | **(585) 273-1687**
407 Goergen Hall

Interests: Optical Design; Engineering

Berger, Andrew J.

Professor of Optics
Associate Professor of Biomedical Engineering
ajberger@optics.rochester.edu | **(585) 273-4724**
405 Goergen Hall
Website

Interests: Biomedical Optics; Optics Education

Bigelow, Nicholas P.

Lee A. DuBridge Professor of Physics
Professor of Optics
nbig@lle.rochester.edu | (585) 275-8549
312 Bausch & Lomb Building
Website

Interests: Quantum Optics; Quantum Physics

Boyd, Robert

Professor of Optics
Professor of Physics
boyd@optics.rochester.edu | (585) 275-2329
308 Wilmot Building
Website

Interests: Nonlinear Optics

Bromage, Jake

Associate Professor of Optics
Senior Scientist and Group Leader, Laser Technology Development, LLE
jbro@lle.rochester.edu | (585) 273-5105
270A LLE—Laboratory for Laser Energetics

Interests: Ultrafast and ultra-intense lasers, optical parametric amplification, and laser diagnostics

Brown, Thomas G.

Professor of Optics
brown@optics.rochester.edu | (585) 275-7816
516 Goergen Hall

Interests: Optoelectronics

Cardenas, Jaime

Assistant Professor of Optics
jaime.cardenas@rochester.edu | (585) 275-7320
226 Wilmot Building
Website

Interests: Nanophotonics; Integrated Photonics; Biophotonics; Lasers; Nonlinear Photonics

Carney, Scott

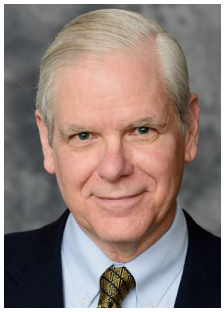
Professor of Optics
Director of the Institute of Optics
scott.carney@rochester.edu | **(585) 274-0113**
113 Wilmot Building

Interests: Computed Imaging; Spectroscopy; Coherence Theory

Eberly, Joseph H.

Andrew Carnegie Professor of Physics
Professor of Optics
eberly@pas.rochester.edu | **(585) 275-4351**
321 Bausch & Lomb Building

Interests: Quantum Optics



Fienup, James R.

Robert E. Hopkins Professor of Optics
Professor of Electrical and Computer Engineering
Professor in the Center for Visual Science
fienup@optics.rochester.edu | **(585) 275-8009**
410 Wilmot Building
Website

Interests: Image Reconstruction; Wavefront Sensing

Foster, Thomas

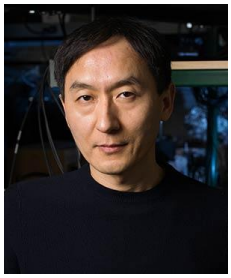
Professor of Imaging Sciences
Professor of Optics
Professor of Physics
Professor of Biomedical Engineering
thomas.foster@rochester.edu | **(585) 275-1347**
3-5333 Medical Center
Website

Interests: Medical Optics; Photodynamic Therapy

George, Nicholas

Emeritus Professor of Optics
nicholas.george@rochester.edu
Website

Interests: Physical Optics; Imaging



Guo, Chunlei

Professor of Optics
guo@optics.rochester.edu | **(585) 275-2134**
419 Wilmot Building
Website

Interests: Laser-Matter Interactions; Ultrafast Phenomena; Surface Functionalization; Atomic & Molecular Physics

Hunter, Jennifer

Assistant Professor, Department of Ophthalmology
Assistant Professor, Department of Biomedical Engineering
Assistant Professor, Center for Visual Science A&S
Assistant Professor, The Institute of Optics
jhunter@UR.Rochester.edu | **(585) 273-4935**
G4111 School of Medicine and Dentistry
Website

Interests: Retinal damage; Retinal imaging

Huxlin, Krystel

James V. Aquavella, MD Professorship in Ophthalmology
Director of Research, Department of Ophthalmology
Professor of Ophthalmology
Professor of Brain/Cognitive Sciences
Professor of Visual Science
Professor of Neuroscience
Professor of Optics
khuxlin@ur.rochester.edu | **(585) 275-5495**
G3186 School of Medicine and Dentistry
Website

Interests: Physiological Optics; Laser Vision Correction; Visual Neuroscience and Perception; Clinical Applications

Knox, Wayne H.

Professor of Optics
Professor of Physics
Professor of Visual Sciences
Professor of Materials Science
wknox@optics.rochester.edu | **(585) 273-5520**
507 Goergen Hall
Website

Krauss, Todd D.

Professor of Chemistry
Professor of Optics
Chair, Chemistry Department
krauss@chem.rochester.edu | **(585) 275-5093**
465 Hutchinson Hall
Website

Interests: Optics of nanoscale semiconductor materials; Quantum optics and nanoscience

Kruschwitz, Brian

Associate Professor of Optics
Senior Scientist, LLE
bkru@lle.rochester.edu | **(585) 273-5104**
LLE—Laboratory for Laser Energetics

Interests: High energy and high power laser systems; Optical systems; Adaptive optics; Laser diagnostics

Kruschwitz, Jennifer D. T.

Assistant Professor of Optics
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509 Wilmot Building

Interests: Optical Interference Coatings and Color

Lin, Qiang

Associate Professor of Optics and Electrical and Computer Engineering
giang.lin@rochester.edu | **(585) 275-3799**
342 Hopeman Building
Website

Interests: Nanophotonic Devices; Physics and Applications

Marciante, John

Associate Professor of Optics
marciante@optics.rochester.edu | **(585) 273-4737**
514 Goergen Hall
Website

Interests: Lasers; Waveguides; Fiber Optics; Ultrafast

Marcos, Susana

The Nicholas George Professor of Optics
The David Williams Director of the Center for Visual Science
Smarcos2@ur.rochester.edu | (585) 276-6279
G4107, Medical Center

Interests: Optics; Ophthalmology; Visual Science

Miller, Benjamin L.

Dean's Professor of Dermatology
Professor of Biomedical Engineering
Professor of Optics
Professor of Biochemistry and Biophysics
benjamin_miller@urmc.rochester.edu | **(585) 275-9085**
5-6141A Medical Center
Website

Interests: Optical Biosensing and Integrated Photonics

Moore, Duncan T.

Rudolf and Hilda Kingslake Professor in Optical Engineering Science
Professor of Optics
Professor of Biomedical Engineering
Professor of Business Administration in the William E. Simon Graduate School of Business Administration
moore@optics.rochester.edu | (585) 275-5248
409A Goergen Hall
Website

Interests: Optical Engineering; Lens Design & Manufacturing; Gradient-Index Optics

Oliver, James

Associate Professor
Scientist, LLE
joli@lle.rochester.edu | (585) 275-1194
LLE—Laboratory for Laser Energetics

Postigo, Pablo

Professor of Optics
ppostigo@ur.rochester.edu

Interests: Nanophotonics; Optoelectronics; Integrated quantum photonics

Renninger, William

Assistant Professor of Optics
william.renninger@rochester.edu | (585) 276-3709
214 Wilmot Building
Website

Interests: Experimental Nonlinear Optics

Rolland, Jannick

Brian J. Thompson Professor of Optical Engineering
Professor of Optics and Biomedical Engineering
Professor in the Center for Visual Science
Director, NSF/IUCRC: Center for Freeform OpticsDirector, R.E. Hopkins Center for Optical Design & Engineering
rolland@optics.rochester.edu | **(585) 752-1013**
505 Goergen Hall
Website

Interests: Optical System Design; Instrumentation and System Engineering; Optical Coherence Tomography; Head Worn Displays

Schmidt, Greg

Assistant Professor of Optics
greg.schmidt@rochester.edu | **(585) 275-8012**
408 Goergen Hall

Stroud, Carlos R., Jr.

Professor of Optics
Professor of Physics
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312 Wilmot Building
Website

Interests: Quantum Optics

Thompson, Brian

Emeritus Professor of Optics
Provost Emeritus
Email address not available

Vamivakas, Nick

Professor of Quantum Optics & Quantum Physics
nick.vamivakas@rochester.edu | **(585) 275-2089**
101 Wilmot Annex
Website

Interests: Quantum Optics; Quantum Physics

Visser, Taco Dirk

Professor of Optics
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315 Wilmot Building

Wicks, Gary W.

Professor of Optics
wicks@optics.rochester.edu | **(585) 275-4867**
109A Wilmot Building
Website

Interests: Molecular Beam Epitaxy; Semiconductor Optoelectronics

Williams, David R.

William G. Allyn Professor of Medical Optics
Professor of Optics
Professor of Brain and Cognitive Sciences
Professor of Ophthalmology
Professor of Biomedical Engineering
Director, Center for Visual Science
david@cvs.rochester.edu | **(585) 275-8672**
270 Meliora Hall
Website

Interests: The Human Visual System; Physiological Optics

Yoon, Geunyoung

Professor of Ophthalmology, Optics
Center for Visual science and Biomedical Engineering
gyoon@ur.rochester.edu | **(585) 273-4998**
G-3184 Medical Center
Website

Interests: Biomedical and Visual Optics; Ophthalmic Optics; Human Vision; Adaptive Optics

Zavislan, James M.

Associate Professor of Optics
Associate Professor of Biomedical Engineering
Associate Professor of Ophthalmology
Associate Professor, Center for Visual Science
Associate Dean of Education and New Initiatives
Mercer Brugler Distinguished Teaching Professor 2018-2021
zavislan@optics.rochester.edu | **(585) 275-9819**
414 Goergen Hall
Website

Interests: Optical Engineering; Biomedical Optical Systems

Zhang, Xi-Cheng

M. Parker Givens Professor of Optics
Professor of Physics
Xi-Cheng.Zhang@rochester.edu | **(585) 275-0333**
415 Goergen Hall
Website

Interests: Ultrafast Photonics; Nonlinear Optics; Laser Physics; TeraHertz Waves

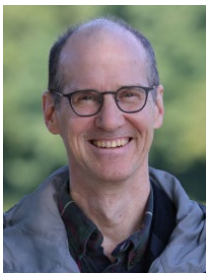
Zuegel, Jonathan D.

Professor of Optics
Director, Laser Development and Engineering Division of LLE
Senior Scientist, LLE
zuegel@lle.rochester.edu | **(585) 275-4425**
278 LLE—Laboratory for Laser Energetics

Interests: Solid-State Lasers; Nonlinear Optics; Electro-Optics; Laser Diagnostics

Adjunct Faculty

This section lists the adjunct faculty members alphabetically with their contact information.



Bowen, John

Adjunct Faculty Member

Bowen@photongear.com | **(585) 415-1752**

Buralli, Dale

Adjunct Associate Professor

buralli@apollooptical.com | **(585) 272-6174**

Cobb, Josh

Adjunct Faculty Member

joshua.cobb@rochester.edu | ***phone number not available***

Eastman, Clarke

Adjunct Faculty Member

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Lukishova, Svetlana G.

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Interests: Quantum Nanophotonics; Liquid Crystals; Nonlinear Optics; Quantum and Nano-Optics Teaching Experiments; History of Optics and Photonics

Mait, Joseph

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mJ8optik@gmail.com

McIntyre, Brian

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202 Wilmot Building

Nelson, Jessica DeGroote

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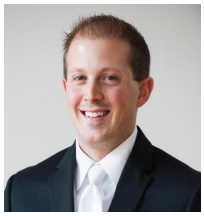

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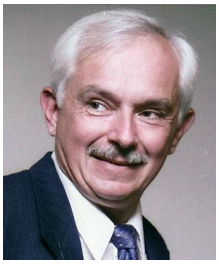
Senior Scientists

This section alphabetically lists other professionals associated with the Institute of Optics and their contact information.



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This section alphabetically lists other professionals associated with the Institute of Optics and their contact information.

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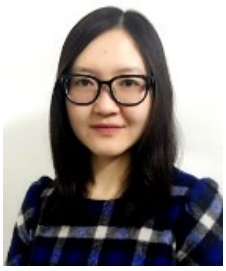

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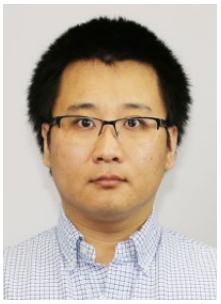

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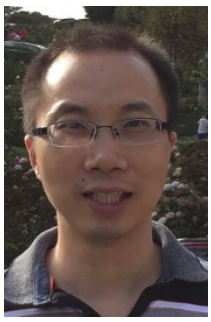

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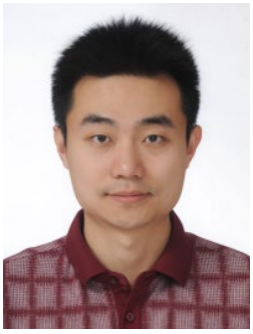

Zhang, Ying

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Graduate Students

View list of graduate students and contact information here:

http://www.hajim.rochester.edu/optics/gradstudents/index.html

Institute Staff

This section lists each staff member alphabetically with his or her area or responsibility and contact information.

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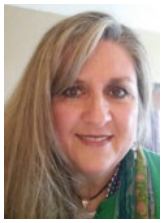

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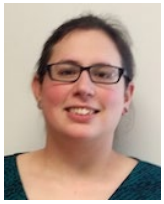

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Professional Organizations: Student Chapters

SPIE

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: Katie Dunn
Vice President: Saleem Iqbal
Secretary: Ben Moon
Treasurer: Wooyoun Kim
Web Administrator: Janet Tang
Communications Officer: Rob Holcomb
Outreach Chair: Tyler Howard
Faculty Advisor: Greg Schmidt
Senior Faculty Advisor: Jannick Rolland

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

OSA

The University of Rochester's Optical Society (OSA) 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 workshops aimed at giving them the skills they need to succeed. As our events this semester have been hosted virtually, 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 virtual social events to promote interaction between students to supplement what they are not getting in person this semester. Our biggest event of the year, bringing together Institute undergraduates, graduates, and faculty, is our annual Photon Cup soccer match with the Physics department. While last year's game was canceled, we are optimistic about returning to defend our title as champions this spring.

Current Officers:

President: Benjamin Nussbaum
Professional Development Chair: Cherine Ghazouani
Social Chair: Madelyn Sabatini
Outreach Chair: Icel Sukovaty
Secretary: Dwight Fairchild
Business Manager: Anand Idris

Please contact Benjamin Nussbaum at bnussbau@u.rochester.edu with any questions, comments, or ideas.

Optics Summer Short-Course Series

June 2021

In 2021, The Institute of Optics will offer its 60th and second virtual annual Summer Short-Course Series with a mix of a courses and virtual course times.
Course dates and registration are set for June 7th-June 23rd, 2021.
The courses listed below are being offered**.**
For details http://www.hajim.rochester.edu/optics/summer/registration.html.

Applied Concepts—colorimetry and vision, wave guide photonics, and more.
Fundamental Concepts—covering lenses, aberrations, principles of diffraction, optical systems, polarization, birefringence and crystal optics, and radiometry and detection.
Integrated Photonics Circuits—targeted for students, researchers, and engineers in industry, who want to learn the fundamental aspects of integrated photonics circuits.
Introduction to Computational Imaging and Information Essentials—introduces computational imaging, a modern paradigm in imaging in which the burden of image formation is no longer borne solely by optical physics.
Modern Optical Engineering—covering optical testing and instrumentation, optical manufacturing, optical thin film coatings, diffractive optics, and glass in modern optics.
Optical System Design—introduces participants to both fundamental and advanced concepts in optical system design by integrating classroom lectures with software training labs. The course can be taken as a full week course or as one of two three-day course options depending on interest/skill level. *Introduction to Optical System Design* covers first order layout, image quality evaluation, aberration theory, optimization, and refractive/reflective design forms. *Advanced topics in optical system design* begins with refractive/reflective design forms and then covers advanced optimization techniques, zoom lenses, aspheres, stray light analysis, tolerancing, and illumination design.
Optical Thin Film Coating Technology—covers all aspects of optical interference devices including thin-film design, digital design methods, and coating and characterization.
Opto-Mechanical Analysis - introduces optics measures, modeling optics, surface errors, stress, optic mounts & bonds, thermal effects, vibrations, system analysis, adaptive mirrors, assembly, testing, and optimization.
Ultrafast Optics and Petawatt Laser Systems -This course serves as an introduction to ultrafast laser systems with an emphasis on chirped pulse amplification and the generation of ultrahigh peak powers and irradiances.