

**THE INSTITUTE OF OPTICS**

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# INDUSTRIAL ASSOCIATES

Program & Resource Guide

Fall 2019

October 31 – November 3



**HAJIM**  
SCHOOL OF ENGINEERING  
& APPLIED SCIENCES  
UNIVERSITY OF ROCHESTER

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## Message from the Director



Welcome to the Fall 2019 session of the Industrial Associates!

Thank you for attending and for your continuing support of the IA program and The Institute. The Institute has never been in better shape. Our Spring program resulted in a lot of positive feedback and we are working to implement many of the ideas you all brought to that meeting. We are pleased to continue to connect our IA members with the resources that make a difference in the world of optics.

Our strength is derived in part from association with our industrial partners. Your direct financial support enables us to do great things for our students. Moreover, the opportunities you provide for our graduates to change the world are the mainstays of our reputation. With this in mind, I want to encourage suggestions from our members for future directions and initiatives you see for potential collaboration, making each other ever better.

We aim for our biannual IA meetings to provide unique opportunities for our members to interact with students and faculty in a special and authentic environment of intellectual exchange and growth. The Friday evening reception provides a networking opportunity for members, students and faculty in a relaxed environment. The Company Connection Showcase provides excellent face-to-face interaction for IA members with students. We hope you will be able to take full advantage of these opportunities and help us make IA an ongoing success.

We are pleased to welcome staff members; Kari Kafka joins as our financial analyst; Meir Brea is our staff accountant; Adrienne Snopkowski is the CeFO financial analyst; and Ed Herger is our laboratory coordinator.

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

Meliora,

A handwritten signature in black ink, appearing to read 'Scott'.

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

# Agenda

## THURSDAY, October 31, 2019

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Events held at the Hilton Garden Inn | University & Medical Center, 30 Celebration Drive, Rochester, NY  
For Strategic Level Members only and others at personal invitation of Dr. Carney.

- 2:00 - 5:30**      *Director's Advisory Council Meeting*  
**5:30 - 7:00**      *Reception w/Light Dinner*  
**7:00 - 9:00**      *Nightcap with the Director*

## FRIDAY, November 1, 2019

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Events held in Douglass Commons, Feldman Ballroom and Wilson Commons, May Room

- 8:00 - 3:30**      **Symposium** will be held in *Douglass Commons, Feldman Ballroom*  
**3:30 - 5:45**      **Company Connection Showcase** will be held in *Wilson Commons, May Room*  
**6:00 - 8:30**      **Reception** will be held in *Douglass Commons, Feldman Ballroom*
- 

- 8:00 - 8:45**      **Continental Breakfast**
- 8:45 - 9:00**      **Introductory Remarks**  
*President Sarah Mangelsdorf*
- 9:00 - 9:15**      **Welcome and The Institute of Optics Update**  
*Dr. P. Scott Carney, Director and Professor of Optics, University of Rochester*
- 9:15 - 9:35**      **Dr. Altaf (Tof) Carim**—High Energy Physics  
*Topic: DOE Office of Science QIS Programs*
- 9:35 - 9:55**      **Chris B. Schaffer**—Associate Professor, Nancy E. and Peter C. Meinig School of Biomedical Engineering @ Cornell University on behalf of The Optical Society (OSA)  
*Topic: Updates on OSA, Subsea OFC, Congressional Awards & Past UR Recipients*
- 9:55 - 10:15**      **Stavros Demos**—Optical Materials Technology Group Leader, LLE  
*Topic: Relocation of the SPIE Laser damage conference to Rochester and opportunities for Industrial Partners*
- 10:15 - 10:45**      **Company Connection Intros (Part 1 of 3)**  
*Brief introductions by company representatives (J → A) - 15*
- 10:45 - 11:05**      **Networking Break**
- 11:05 - 11:20**      **Nicholas Kochan, PhD**—Graduate Student in Optics & President, SPIE Student Chapter  
*Topic: Industry, IA Members, and Student Connections*
- 11:20 - 11:50**      **Company Connection Intros (Part 2 of 3)**  
*Brief introductions by company representatives (Z → O) - 15*
- 11:50 - 12:10**      **Dr. Alexis Vogt**—Endowed Chair and Associate Professor of Optics, Monroe Community College (MCC) Engineering Technologies  
*Topic: \$4.4M Federal Grant for MCC*

**FRIDAY, November 1, 2019 (Continued)**

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- 12:15 - 1:15      **Lunch and Poster Session**  
*Douglass Commons | Feldman Ballroom*  
*Wilson Commons | Bridge Lounge*  
Note: Lunch will be in *Feldman Ballroom*  
 Posters will be in the *Bridge Lounge*
- 1:15 - 2:15      **Graduate Student Research Talks**  
*Featuring four (4) outstanding upper level Graduate Students (15 minutes each)*
- 2:15 - 2:35      **Blake Coughenour**, Senior Optical Engineer, Apple  
Topic: *Fresnel Lens Design Innovation*
- 2:35 - 2:50      **Company Connection Intros (Part 3 of 3)**  
*Brief introductions by company representatives (N → K) - 8*
- 2:50 - 3:00      **Kai Davies**, Optics Graduate Coordinator  
Topic: *MS Co-ops*
- 3:00 - 3:30      **Master's Students Showcase**  
*Featuring nine (9) MS students presenting educational background, work experience and career goals, Note: They typically expect to graduate in May.*
- 3:30 - 5:30      **Company Connection Showcase**  
*Wilson Commons, May Room*
- 5:45 - 6:00      **Networking Break**
- 6:00 - 8:30      **Industrial Associates Reception**  
*Douglass Commons, Feldman Ballroom*
- 6:30 - 6:35      **Welcoming Remarks**  
*Dr. P. Scott Carney, Director and Professor of Optics, University of Rochester*

**SATURDAY, November 2, 2019**

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*Interviews for Associate, Standard, Select, & Strategic IA members:*

- 8:00 - 5:00      **Company - Student Employment Interviews—All**  
*Various rooms in Goergen Hall & Wilmot Building*
- 12:00 - 1:00      **Lunch for interviewing Employers, Faculty/Staff**  
*Goergen Hall | CR108*
- 12:00 - 1:00      **Lunch for interviewing Students**  
*Goergen Hall | Munnerlyn Atrium*

**SUNDAY, November 3, 2019 (Reminder: Daylight Saving Time - clocks move back 1 hour)**

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*Interviews continue for Select & Strategic IA members only:*

- 8:00 - 12:00      **Company - Student Employment Interviews**  
*Various rooms in Goergen Hall & Wilmot Building*

## *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 40<sup>th</sup> 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.

Finally, we are pleased to utilize Handshake as our career services platform for organizing interviews. An overview was shared during the Spring 2018 symposium along with demos. Please let us know if any additional assistance is required.

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**  
[www.asml.com](http://www.asml.com)



**Collins Aerospace**  
A United Technologies Company

**Collins Aerospace**  
[www.collinsaerospace.com](http://www.collinsaerospace.com)



**Corning Incorporated**  
[www.corning.com](http://www.corning.com)



**Edmund**  
optics | worldwide

**Edmund Optics**  
[www.edmundoptics.com](http://www.edmundoptics.com)



**L3HARRIS**

**L3Harris Technologies**  
[www.l3harris.com](http://www.l3harris.com)



Experience | Solutions

**Newport**  **mks**

**Newport Corp | MKS Instruments**  
[www.newport.com](http://www.newport.com) | [www.mksinst.com](http://www.mksinst.com)



**OptiPro Systems, Inc.**  
[www.optipro.com/index.html](http://www.optipro.com/index.html)



**Synopsys**  
[www.synopsys.com](http://www.synopsys.com)



**Zemax**  
[www.zemax.com](http://www.zemax.com)



**Zygo**  
[www.zygo.com](http://www.zygo.com)

# INDUSTRIAL ASSOCIATES

## SOCIETY, TRADE, & ACADEMIC ASSOCIATION IA MEMBERS



**Monroe Community College**  
STATE UNIVERSITY OF NEW YORK

**Monroe Community College**  
[www.monroecc.edu](http://www.monroecc.edu)



**NextCorps | Luminate**  
[www.nextcorps.org](http://www.nextcorps.org)  
[www.luminate.org](http://www.luminate.org)



**NY State | Rochester Regional Photonics**  
[www.newyorkphotonics.org](http://www.newyorkphotonics.org)  
[www.rrpc-ny.org](http://www.rrpc-ny.org)



**The Optical Society**  
[www.osa.org](http://www.osa.org)



**The International Society for Optics and Photonics**  
[www.spie.org](http://www.spie.org)

## SELECT IA MEMBERS



**Air Force Research Lab (AFRL)**  
[www.wpafb.af.mil/afrl/](http://www.wpafb.af.mil/afrl/)



**Apple**  
[www.apple.com](http://www.apple.com)



**BAE SYSTEMS**  
[www.baesystems.com](http://www.baesystems.com)

## INDUSTRIAL ASSOCIATES

## SELECT IA MEMBERS (Continued)



FUTUREWEI

**Futurewei Technologies**

(sub: Huawei)

[www.huawei.com](http://www.huawei.com)



**IDEX Health & Science**

(subs: Melles Griot & Semrock Incorporated)

[www.idex-hs.com](http://www.idex-hs.com)



**II-VI Incorporated**

[www.ii-vi.com](http://www.ii-vi.com)



**Lawrence Livermore National Lab**

[www.llnl.gov](http://www.llnl.gov)



**Lockheed Martin**

(Missile & Fire Control and Space Systems)

[www.lockheedmartin.com](http://www.lockheedmartin.com)



**MIT Lincoln Laboratory**

[www.ll.mit.edu](http://www.ll.mit.edu)



**Raytheon**

[www.raytheon.com](http://www.raytheon.com)



**Rochester Precision Optics**

[www.rpoptics.com](http://www.rpoptics.com)



**Sunny Optical Technology Group Co., Ltd.**

[www.sunnyoptical.com](http://www.sunnyoptical.com)



**Viavi Solutions**

[www.sunnyoptical.com](http://www.sunnyoptical.com)

**RPC Photonics, Inc.**

[www.rpcphotonics.com](http://www.rpcphotonics.com)



**Xerox Corporation**

[www.xerox.com](http://www.xerox.com)

## INDUSTRIAL ASSOCIATES

## STANDARD IA MEMBERS



Avo Photonics

**Avo Photonics**  
[avophotonics.com](http://avophotonics.com)

**facebook**  
 Reality Labs

**Facebook Reality Labs**  
[www.facebook.com/careers/areas-of-work/facebookrealitylabs](http://www.facebook.com/careers/areas-of-work/facebookrealitylabs)



**JANOS Technology**  
[www.janostech.com](http://www.janostech.com)



**JENOPTIK Optical Systems**  
[www.jenoptik-inc.com](http://www.jenoptik-inc.com)



**Luna Innovations**  
[www.lunainc.com](http://www.lunainc.com)



**Navitar**  
[www.navitar.com](http://www.navitar.com)



**OPTIMAX Systems, Inc.**  
[www.optimaxsl.com](http://www.optimaxsl.com)



**Quality Vision International, Inc.**  
[www.qvii.com](http://www.qvii.com)



**Safran | Optics 1**  
[www.optics1.com](http://www.optics1.com)



**SONY Electronics Inc.**  
[www.sony.com](http://www.sony.com)

## INDUSTRIAL ASSOCIATES

## ASSOCIATE IA MEMBERS



**Bristol Instruments, Incorporated**  
[www.bristol-inst.com](http://www.bristol-inst.com)



**Daheng Optics**  
[www.cdhoptics.com](http://www.cdhoptics.com)



**Gray Optics**  
[www.grayoptics.com](http://www.grayoptics.com)



**Johns Hopkins Applied Physics Lab**  
[www.jhuapl.edu](http://www.jhuapl.edu)



**Optikos**  
[www.optikos.com](http://www.optikos.com)



**Plymouth Grating Laboratory**  
[www.plymouthgrating.com](http://www.plymouthgrating.com)



**TOPTICA Photonics, Inc.**  
[www.toptica.com](http://www.toptica.com)



**Wavefront Research, Inc.**  
[www.wavefrontresearch.com](http://www.wavefrontresearch.com)

## Guest Speaker



**Sarah C. Mangelsdorf**  
*President, University of Rochester*

### *Introductory Remarks*

President Mangelsdorf is an experienced academic leader who served as provost at the University of Wisconsin-Madison before coming to Rochester in July. She is a professor of psychology who is internationally known for her research on the social and emotional development of infants and young children.

A seasoned administrator, Sarah is known for her work on issues of academic quality, educational access, and diversity and inclusion at some of the nation's leading public and private institutions. She has earned wide recognition for developing important strategic initiatives tailored to the goals of each institution and for taking a leading role in building both financial and institutional support for those goals.

As chief operating officer at Wisconsin, Sarah's responsibilities included oversight of all academic programs and budget planning for 12 schools and colleges, including Education, Business, Engineering, and Graduate Studies, as well as the Schools of Medicine and Public Health and of Nursing, which are affiliated with UW Health, the integrated health system of the University of Wisconsin-Madison.

Before she became provost at Wisconsin in 2014, Sarah served as dean of the Weinberg College of Arts and Sciences at Northwestern University. She began her academic career at the University of Michigan and in 1991 moved to the University of Illinois at Urbana-Champaign, where she later was the first woman to serve as dean of the College of Liberal Arts and Sciences.

Sarah is a third-generation academic: her father was a professor of physics at Swarthmore College and her grandfather was a professor of botany at Harvard. She and her husband, Karl Rosengren, a developmental psychologist who is now a tenured faculty member in the Department of Brain and Cognitive Sciences and in the Department of Clinical and Social Sciences in Psychology, have two adult daughters, a son-in-law, and a beloved family cat.

## Guest Speaker



### **Altaf H. (Tof) Carim**

*Office of High Energy Physics / Office of Science  
U.S. Department of Energy*

*DOE Office of Science QIS Programs*

Dr. Altaf H. (Tof) Carim covers a range of programmatic, planning, and policy topics for the Office of High Energy Physics (HEP) and the Office of Science (SC), including international interactions and agreements, research infrastructure policy and coordination, and quantum information science.

He returned to DOE and joined HEP in April 2017 after nearly six years on detail at the White House Office of Science and Technology Policy (OSTP), where he was Assistant Director for Research Infrastructure from 2014 to 2017 and Assistant Director for Nanotechnology from 2011 to 2014. He served as the co-chair or White House liaison for a number of National Science and Technology Council (NSTC) subgroups, including the Interagency Working Group on Quantum Information Science, the Subcommittee on Physical Sciences, the Subcommittee on Critical and Strategic Mineral Supply Chains, and the Subcommittee on Nanoscale Science, Engineering, and Technology, and was involved in a variety of other materials, energy, facilities, space, and broad science policy issues at OSTP.

At DOE/SC from 2001-2011, Dr. Carim was in the Office of Basic Energy Sciences, with responsibilities including leading the original management team for the Energy Frontier Research Center collaborations, overseeing construction and operations of Nanoscale Science Research Centers and other user facilities, and managing grant and national laboratory programs in the structure and composition of materials. Previously, Dr. Carim served for over a decade on the faculty at The Pennsylvania State University and had research posts and activities at the University of New Mexico, Philips Natuurkundig Laboratorium in The Netherlands, Philips Research Laboratories Sunnyvale, Bell Laboratories, Xerox Palo Alto Research Center, and the Carnegie Institution of Washington. He received his Ph.D. and M.S. at Stanford University and S.B. at the Massachusetts Institute of Technology, all in Materials Science and Engineering. He has authored or coauthored 90 research publications, primarily in microstructural and microchemical characterization of materials, and delivered more than 220 presentations on science, technology, policy, and Federal programs. His awards and honors include recognition as an Office of Naval Research Young Investigator, receipt of an AIST Foreign Researcher Invitation to lecture in Japan, and participation in project teams recognized with several of the Secretary of Energy's Project Management Excellence Awards.

## Guest Speaker



### **Chris B. Schaffer**

*Associate Professor in the Meinig School  
of Biomedical Engineering*

### *OSA Updates and Current Events*

Chris B. Schaffer is an Associate Professor in the Meinig School of Biomedical Engineering. He received his undergraduate degree from the University of Florida and his PhD from Harvard University, both in physics, before working as a post-doc in David Kleinfeld's neuroscience laboratory at the University of California, San Diego. The lab he now jointly runs with Prof. Nozomi Nishimura at Cornell develops advanced optical techniques that enable quantitative imaging and targeted manipulation of individual cells in the central nervous system of rodents and uses such tools to construct a microscopic-scale understanding of normal and disease-state physiological processes in the brain. One area of current focus is understanding the role of brain blood flow disruptions in the progression of Alzheimer's disease. Chris is also active in developing novel educational strategies to teach science as a dynamic process for discovery that are used in outreach settings in middle and high-school science classes as well as in college-level courses and international student exchange programs. Chris also has a strong interest in science policy and spent a year in Washington, DC as a science policy fellow in the office of Senator Edward Markey. He continues to be active in policy, including through a science policy course he teaches. Chris is an accomplished surfer, having ridden waves all over the world and surfed some "big wave" spots, including greater than 20 ft. waves at Todos Santos, Mexico.



## Guest Speaker



### **Stavros Demos**

*Optical Materials Technology Group Leader  
LLE—Laboratory for Laser Energetics*

*Relocation of the SPIE Laser damage conference  
to Rochester and opportunities for Industrial  
Partners*

Stavros Demos is a Senior Scientist and the Group Leader of the Optical Materials Technologies Group at University of Rochester's Laboratory for Laser Energetics (LLE). He came to LLE in 2016 after almost 20 years as a Scientist at Lawrence Livermore National Laboratory. He received his B.S. in Physics from the University of Ioannina, Greece and his Ph.D. in Physics in 1993 from the City University of New York under the supervision of Prof. Robert Alfano. His thesis work was focused on the understanding of the nonradiative relaxation of active ions in tunable laser materials. His research is focused in the areas of characterization in optical materials and devices for high-power/peak-intensity laser systems and the development of next generation designs and materials. His current research interests also extend to in the fields of additive manufacturing and biomedical optics toward developing instrumentation for rapid and in vivo detection of disease and monitoring of therapeutic intervention. Stavros is a Fellow of the American Physical Society and of the Optical Society of America.

## *Guest Speaker*



### **Nicholas Kochan, PhD**

***Candidate in Optics and  
President, SPIE—Student Chapter***

***Industry, IA Members, and Student Connections***

Nicholas Kochan is currently a PhD student working in the Moore Group at the University of Rochester. His research focuses on novel optical design and metrology methods, with a focus on gradient index optics. Kochan is currently the president of the SPIE student chapter at the University of Rochester, supporting and representing chapter efforts to create conversations in optics and participate in community outreach. In Spring 2019 he led a group of students in the creation of the first optics outreach event at the Rochester Lilac Festival, the largest free festival in Rochester. Kochan holds the BS in Optics and a Minor in Mathematics from the University of Rochester.

## Guest Speaker



### **Dr. Alexis Vogt**

***Endowed Chair & Associate Professor of Optics Monroe Community College Engineering Tech***

***\$4.4 Million Federal Grant for MCC***

Dr. Alexis Vogt received her PhD in Optics from the Institute of Optics at the University of Rochester. She currently serves as Endowed Chair and Associate Professor of Optics at Monroe Community College (MCC), State University of New York. Prior to joining MCC, Dr. Vogt was the Applications and Business Development Manager at Melles Griot, and prior to that, designed contact lenses and intraocular lenses for Bausch + Lomb. In addition to her industry experience, Dr. Vogt holds three patents and has authored numerous research papers and other publications. She has even authored the definitions of 'light' and 'polarization' for The World Book Encyclopedia. In recent times, she has been working on a program known as 'OPT IN!' This educational program provides professional development and training in the field of optics, strengthens industry partnerships and broadens community awareness of educational and employment opportunities.

For additional information: <https://www.scientia.global/dr-alexis-vogt-opt-in-generating-experts-in-the-field-of-optics/>

## *Guest Speaker*



**Blake Coughenour**

*Senior Optical Engineer, Apple*

*Fresnel Lens Design Innovation*

## Guest Speaker



### **Kai Davies**

***Graduate Program Coordinator  
The Institute of Optics***

***MS Co-ops***

Kai Davies currently serves as the Graduate Program Coordinator for the Institute of Optics at the University of Rochester, and was recently appointed as the chair for the Institute of Optics' MS Co-op Program Committee. Mx. Davies initially joined the Institute of Optics as an administrative assistant to Prof. Chunlei Guo in 2015, having previously worked in internet marketing. Kai Davies received their B.A. in Anthropology from SUNY Geneseo.

## Poster Session

Each Industrial Associates meeting features a kaleidoscope of posters providing a seasonal glimpse into the research projects of The Institute of Optics. Members and attendees will find posters on display in the *Wilson Commons | Bridge Lounge* during the lunch break.

## Graduate Students' 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.

### PhD Research Talks



Jiapeng Zhao, Optics PhD Student

“Spatial sampling of terahertz field with sub-wavelength accuracy via probe beam encoding”



Samuel Steven, Optics PhD Student

“Design of adaptive optics ophthalmoscopes”

## *PhD Research Talks (Continued)*



**Aby Joseph, Optics PhD Student**

"In vivo and label-free imaging of single-cells in the immune response of the retina"



**Daniel Nikolov, Optics PhD Student**

"Software and hardware platforms enabling the next generation near-eye displays"

## MS Showcase

## Elizabeth A. Bogart

### Education Highlights

- M.S. in Optics, University of Rochester, May 2020
- B.S. in Imaging Science, Magna Cum Laude, Rochester Institute of Technology, May 2019

### Work Experience

- Laboratory for Laser Energetics**, Aug 2019 - Present  
Project Assistant: Analyzing and optimizing electron-optical systems in SIMION for future prototypes.
- Applied Image Inc.**, Summer 2018  
Image Science Intern
- Oak Ridge National Lab**, Summer 2016  
Higher Education Research Experience (HERE) Intern



### Objectives

- Seeking full-time employment after graduation
- Exploring opportunities in medical imaging technology, especially new system design and novel imaging and image processing problems.

## Brianna M. Holmes

### Education Highlights

- M.S. in Optics, Rochester University, May 2020
- B.A. in Physics with Honors, Magna Cum Laude, Colgate University, May 2019

### Work Experience

- Researcher, Colgate University, 2017-2019
  - Responsibilities included designing and aligning optical apparatus, programming SLM's, collecting and analyzing data using polarimetry methods, writing about results
  - Holmes, B.M., Galvez, E.J., (2019) "Poincaré Bessel beams: structure and propagation." *J. Opt.* 21 104001
- Electronics TA, Colgate University, Spring 2019
- Researcher, Glasgow University, Summer 2018



### Objectives

- Seeking careers in coating techniques, optical fabrication, integrated photonics, alignment processes
- Seeking Co-op position or post-grad position

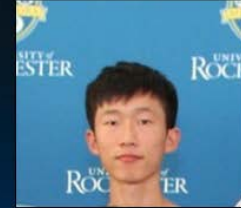


*MS Showcase (Continued)*

## Guoxin Li(Lee)

### Education Highlights

- M.S. in Optics, University of Rochester, May 2020
- B.S. in Optical Engineering, Cum Laude, University of Rochester, May 2019



### Research and Internship Experience

- Researcher, ITMO university, May 2016
  - Responsibilities included setting up the Mach-Zehnder interferometer, learning Labview and using it to analyze data ,comparing results between liebling and FFT(Fast Fourier Transform), comparing conventional holography and digital holography
  - Presenting the Project
- Technical support, Sunny Optical Technology, May 2019

### Objectives

- Seeking careers in optics
- Seeking Co-op position

## Alen Philip

### Education Highlights

- Pursuing masters degree in optics from Institute of Optics, University of Rochester.
- Posses masters degree in physics from the Institute of Science Education and Research, Bhopal.
- Geometrical Optics, Integrated Photonics, Wave optics and Imaging, Quantum mechanics, Quantum Engineering, Quantum Information Theory, Decoherence and Open Quantum Systems, Numerical methods and Programming, Electrodynamics, Condensed Matter Physics, Experimental Techniques



### Work Experience

- Masters thesis on study of single NV centers in Diamond
- Summer internship project on resistive switching in Al – doped CuZnS
- Summer internship on synthesis, laser ablation and characterization of ferrite Nano particles
- Proficient in setting up a confocal microscope setup.
- Has experience using Pulsed Nd-YAG laser, Diode pumped solid state laser, High frequency signal generator, Swabian Instruments Pulse Streamer, X-Ray Diffractometer, UV Visible Spectroscope, Spray pyrolysis Equipment
- Comfortable with programming using Python, C++, MATLAB and LabVIEW
- Proficient in using MS Office Suit
- Has experience in modelling and 3D printing parts necessary for experiments.

### Objectives

- Seeking either a Co-op position or a summer internship.

## MS Showcase (Continued)

## Dita Banjarnahor

### Education Highlights

University of Rochester, MS in Optics (expected May 2020)  
 Institut Teknologi Bandung, BS in Engineering Physics, 2016

### Work Experience

High Intensity Femtosecond Laser Laboratory,  
 Research Assistant on Super-hydrophilic Metal  
 (2019 – present)  
 CTECH Labs EdWar Technology,  
 Research Intern on Magnetic Induction Tomography  
 (2017)  
 The Institute of Optics, UofR,  
 Teaching assistant of Wave Optics & Imaging (2019)



### Objectives

Exposure to all variety of works  
 being done in area of Optics  
 Full-time employment  
 Start date: Summer 2020

## Zhen Wang

### Education Highlights

- Nanjing University of Science &  
 Technology, BENG, Sept. 2015-June 2019  
 - Zemax, Matlab, Python, C++

### Work Experience

- Projects on Optics Design  
 Using Zemax to do the lens design



### Objectives

- Looking for a Co-op position

*MS Showcase (Continued)***ZHENHUA GUO**Education Background

- Master of Science in Optics, University of Rochester
- Exchange student of Optical Science and Engineering, University of Arizona
- Bachelor of Engineering in Opto-Electronic Information Science and Engineering, Tianjin University

Skills

- MATLAB; Mathematica; CodeV; Solidworks; Microsoft Office; Optical system design and optimization; Optical instrument alignment and measurement.

Research Experience

- Superconducting nanowire single photon detection (Undergrad Research )  
Contribution: Designed cryocooler system; Built optical system and measured detector efficiency.

--Prof. Xiaolong Hu's Lab

- Ultrafast pulse amplification at multiple wavelengths (Grad Research)  
Contribution: Simulated the Four Wave Mixing pulse propagation and amplification process; Generated the Gain & Efficiency plot with different input conditions.

-- Prof. Renninger's Lab

Objectives

- Looking for full time job or intern in photonics and fiber optics engineering in Fall 2020.

**Zilong (Jack) Li**Education Highlights

- B.S. in Optical engineering (2018),
- M.S in Optics (anticipated Dec 2019),  
technical skills: Code V, Lighttools,  
OptiLayer, advanced laboratory skills, optical  
fabrication, and metrology.

Work Experience

- Test engineer & algorithm feedback of CE30 solid Lidar
- Team member of OPT 544 Coast Guard Camera design Project, SWIR band
- Student researcher, super-hydrophobic materials
- Graduate laboratory teaching assistant

Objectives

- Seeking for a full-time job
- Optical engineer, product manager, technical support engineer, etc

## MS Showcase (Continued)

### Yiyang Wu

- 2<sup>nd</sup> year Optics MS
- 4 year Optics undergrad
- 4 year lab experience

#### Work Experience

- Thesis: 2 wavelength phase shifting interferometry on femtosecond laser written materials
- Metrology, lens design, illumination, opto-electronic devices



#### Objectives

Domestic intern/full-time position in AR/VR or new tech company

## *Music by Eastman Artists at the Reception*

### TRINIDY

Trinity is a jazz trio band composed of students from the Eastman School of Music in Rochester, New York. The group members include the bandleader, **Emiel De Jaegher** on trumpet (from Belgium), **Stephen Parisi, Jr.** on bass (from Buffalo, NY), and **Ryan Brasley** on drums (from Chicago, IL). The group has been together for three years, based in Rochester, NY. With a chord less instrumentation, the band is able to explore new avenues for creating music, mainly featuring jazz standards and original compositions. The group has been invited to travel and play at venues in Rochester/Buffalo/Syracuse/Manhattan, NY, Baltimore, MD, Washington D.C, Philadelphia, PA, as well as recently going on tour in Chicago, Illinois in August of 2019. Trinity can be seen in a variety of different musical situations, playing live performances featuring original music, background at cocktail hours playing jazz standards, wedding ceremonies, receptions, private (house) parties both in loud/quiet atmospheres.

#### **Emiel De Jaegher (Trumpet)**

Emiel De Jaegher is a musician, composer and educator from Chicago, Illinois, currently based in Rochester, New York playing jazz, classical, fusion, punk, hip-hop, and folk music. During high school, he was a leading member of capstone ensembles that toured across France, The Netherlands, Italy, Ireland, Japan, Scotland, and venues including Snug Harbor, New Orleans and Ulster Hall, Northern Ireland. He is currently a senior undergraduate student at the Eastman School of Music/University of Rochester doing a degree in Brain and Cognitive Sciences (Music Cognition) and Jazz Trumpet Studies with Clay Jenkins and has played lead trumpet in the Eastman Jazz Ensemble, directed by Bill Dobbins, for the past two years. In his first year at Eastman, he was named a semifinalist in the jazz division of the National Trumpet Competition and continued in 2019 by placing as a semifinalist in the small classical ensemble division and won third place in the jazz division. In 2019, he was selected as a member of the prestigious Betty Carter Jazz Ahead Program, performing a residency at the Kennedy Center from May 28th-June 9th, working under the tutelage of Jason Moran, Dee Dee Bridgewater, Marcus Printup, Casey Benjamin, Peter Martin, Chris Thomas, and Greg Hutchinson: <https://jazztimes.com/blog/2019-jazz-ahead-program-announces-24-artists-from-7-countries> / (Article featured in Jazz Times) Since the beginning of 2018, he is the top call trumpet player in the upstate New York circuit for the Silver Arrow Band, voted best wedding band by The Knot and Wedding Wire for five consecutive years (2015-2019). He has also been a teacher at the 2019 Birch Creek Music Performance Center Jazz I Session for young high school jazz students. He is also the leader of many of his own projects included his chord less trio Trinity that has toured in Baltimore, Washington D.C., Chicago and Rochester. Throughout his time playing trumpet, he has had the opportunity to share the stage with Danilo Pérez, Martin Wind, Bill Cunliffe, Scott Robinson, Charles Pillow, Tanya Darby, John Clayton, Marquis Hill, Lauren Sevian, Matt Wilson, Ingrid Jensen, and Tim Hagans.

#### **Stephen Parisi, Jr. (Bass)**

Stephen Parisi Jr is a jazz bassist and composer from Buffalo, New York. Stephen has played with artists such as Bobby Militello, Mark Filsinger, Jane Monheit, and Daryl Washington. Stephen has worked with Chris Vidala, Jay Ashby and is currently attending the Eastman School of Music studying with Jeff Campbell.

#### **Ryan Brasley (Drums)**

## *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 scientist; 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.

## Optics Self-Study

### Overview

The self-study is The Institute's portrait of itself and the foundation for the blueprint of its future. It should be informative to the external reviewers who are experts in the field, and to internal readers who may not be. Gathering the materials, reaching consensus, and writing the self-study should be a constructive activity for members of The Institute. Each committee will create a self-study of their respective area and all of the committee self-studies will be combined into one report for the Dean's office and the External Review Advisory Committee.

### Outline:

- 1) Faculty and staff are assigned to committees. Further information on committee makeup and topic is on page 2 and 3.
- 2) Each committee is charged with creating a self-study of their respective area of review.
- 3) Self-studies are reviewed, compiled, and formatted into a larger self-study report.
- 4) An External Review Advisory committee is selected by the Dean's Office, in consultation with the faculty of The Institute.
- 5) The report is disseminated to the Optics faculty, the Dean's office, and to the External Review Advisory Committee.
- 6) The External Review Advisory Committee conducts a site-visit and creates their own report based on their findings.
- 7) The Institute faculty and deans review the external review report.
- 8) The Institute prepares a strategic response to the external review report recommendations, submitting their strategic response to the Dean's Office.
- 9) Optics follows through on the strategic response with support from the administration.

### Purpose

We constantly strive to identify areas for improvement or change to ensure that we continue to deliver to our stakeholders a level of excellence that lives up to our historical standard. As the discipline of optics changes and grows, we need to be able to adapt and respond to those changes in order to deliver the highest possible value to our stakeholders.

### Value Proposition

The focus of The Institute of Optics is excellence in research and teaching. The self-study is the beginning of a process culminating in a strategic plan to support this excellence by identifying and providing an assessment of our current capacity, as well as a roadmap for future capacity. It will ultimately provide access to greater resources and open doors to new opportunities by providing a framework to operate at a strategic level.



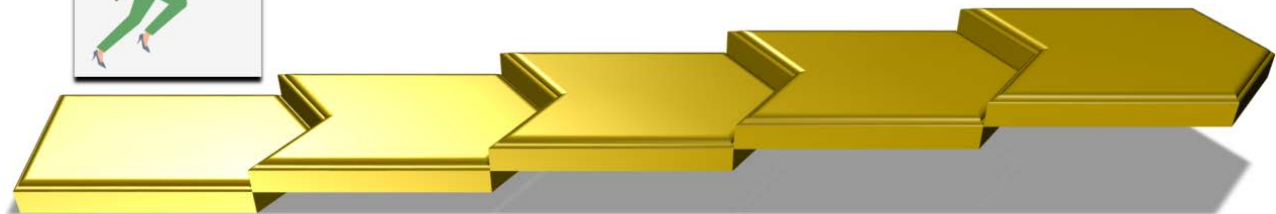
### External Review Team and Visit

The External Review Advisory Committee consists of at least three specialists in the field of Optics and/or academia from outside the University of Rochester. Dean Heinzelman will form the committee after consultation with the faculty of the department and director. The team will evaluate the principal activities, resources, and stated goals to assess The Institute's trajectory, and to make recommendations.

### Strategic Planning

Upon completion of the internal and external reviews, the Director will form a team of faculty and stakeholders to weigh the findings and recommendations of the reviews and respond with a strategic plan. The plan will include a feedback mechanism, measurable goals, verifiable metrics, contingency options, and a final report at the conclusion of the period covered by the plan.

## Self-Study Timeline



Self-Study  
conducted & report  
created

May-Nov 2019

External review  
committee site visit

Dec-Feb 2020

Strategic planning

March-April 2020

Strategic plan  
created & reviewed

April-May 2020

Implementation

June-Dec 2020

## *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. Because of the substantial overlap between optics, mathematics, and physics, many students opt for either a minor or a double major in one of the other disciplines. By choosing appropriate technical electives, and a design project, students can complete a degree in optical engineering. Students with an interest in fundamental applied optics may opt for a senior thesis and qualify for a degree in optics.

The basic elements of this demanding degree are outlined below. The required optics courses are carefully designed to span the most significant areas in classical and modern optics. In addition, three technical electives are required, which allow students to tackle a specialty such as lens design, electron microscopy, thin films, or any course selected from the MS curriculum. Undergraduates are encouraged to gain technical experience through paid laboratory assistantships, summer research (e.g. REU) programs, industrial employment and internships, and senior-level honors research.

With a history of more than 75 years and more than three thousand graduates, the optics B.S. program is well-recognized by the optics industry and is well-established as a high-quality undergraduate department. 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 (OE) consists of a minimum of 130 credit hours of coursework. Required courses are noted with “(req.)” in the table on the next page. Please note: The first three years are virtually identical for students pursuing either degree (all courses carry 4 credits unless otherwise indicated). The course requirements are applicable for the Class of 2019. Changes will affect students in the Class of 2020 and beyond as described on the website.

**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 – Class of 2019 and Beyond

Year	Fall Courses	Spring Courses
<b>Year 1:</b> Freshman ~30 Credits	<b>MTH 161</b> Calculus I <b>CHM 131</b> Chemistry for Engineers <b>WRT 105*</b> College Writing or Cluster Course #1 <b>OPT 101</b> Introduction to Optics ( <i>recommended</i> )	<b>MTH 162</b> Calculus II <b>PHY 121</b> Mechanics <b>WRT 105*</b> College Writing or Cluster Course #1 <b>OPT 211</b> MATLAB for Optics Majors I (2cr.)
<b>Year 2:</b> Sophomore ~36 Credits	<b>OPT 241</b> Geometrical Optics <b>OPT 201</b> Geometrical Optics Lab (2cr.) <b>MTH 164</b> Multidimensional Calculus <b>PHY 122</b> Electricity and Magnetism Cluster course or tech elective	<b>OPT 261</b> Interference & Diffraction <b>OPT 202</b> Physical Optics Lab (2cr.) <b>OPT 287</b> Math Methods for Optics and Physics <b>PHY 123</b> Waves and Modern Physics Cluster course or tech elective
<b>Year 3:</b> Junior ~32 Credits	<b>OPT 242</b> Aberrations & Testing <b>OPT 203</b> Aberrations & Testing Lab (2 cr.) <b>OPT 262</b> Electromagnetic Theory <b>MTH 165</b> Linear Algebra w/ Diff. Equations <b>OPT 212</b> MATLAB for Optics Majors II (2cr.)	<b>OPT 225</b> Sources and Detectors <b>OPT 204</b> Sources/Detectors Lab (2cr.) <b>ECE 210**</b> Circuits for Engineers <b>WRT 273</b> Engineering: Communicating your Professional Identity <b>OPT 223</b> Quantum Theory
<b>Year 4:</b> Senior ~32 Credits	<b>B.S. in Optics (OPT)</b> <b>OPT 320</b> Senior Thesis I Cluster, Tech, or free elective x 3  <b>B.S. in Optics (OE)</b> <b>OPT 310</b> Senior Design I Cluster, tech, or free elective x 3	<b>B.S. in Optics (OPT)</b> <b>OPT 321</b> Senior Thesis II Cluster, tech, or free elective x 3  <b>B.S. in Optics (OE)</b> <b>OPT 311</b> 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 may 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 2018, The Institute placed 90 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

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## 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)*

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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](mailto: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](mailto: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](mailto:bentley@optics.rochester.edu) | (585) 273-1687

407 Goergen Hall

**Interests:** Optical Design; Engineering



### [Berger, Andrew J.](#)

*Professor of Optics*

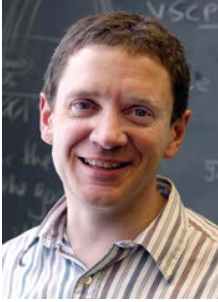
*Associate Professor of Biomedical Engineering*

[ajberger@optics.rochester.edu](mailto: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](mailto: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](mailto: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](mailto: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](mailto:brown@optics.rochester.edu) | (585) 275-7816

516 Goergen Hall

**Interests:** Optoelectronics



## Cardenas, Jaime

*Assistant Professor of Optics*

[jaime.cardenas@rochester.edu](mailto: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](mailto: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](mailto: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](mailto: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](mailto:thomas.foster@rochester.edu) | (585) 275-1347

3-5333 Medical Center

[Website](#)

**Interests:** Medical Optics; Photodynamic Therapy



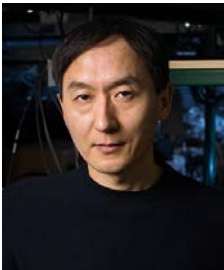
## George, Nicholas

*Emeritus Professor of Optics*

[nicholas.george@rochester.edu](mailto:nicholas.george@rochester.edu)

[Website](#)

**Interests:** Physical Optics; Imaging



## Guo, Chunlei

*Professor of Optics*

[guo@optics.rochester.edu](mailto: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*

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G4111 School of Medicine and Dentistry

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**Interests:** Retinal damage; Retinal imaging



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*James V. Aquavella, MD Professorship in Ophthalmology*

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*Professor of Brain/Cognitive Sciences*

*Professor of Visual Science*

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G3186 School of Medicine and Dentistry

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



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



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 LLE—Laboratory for Laser Energetics

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



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**Interests:** Optical Interference Coatings and Color



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**Interests:** Nanophotonic Devices; Physics and Applications



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**Interests:** Lasers; Waveguides; Fiber Optics; Ultrafast



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*Professor of Biomedical Engineering*

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[Website](#)

**Interests:** Optical Biosensing and Integrated Photonics



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*Professor of Biomedical Engineering*

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[Website](#)

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**Interests:** Experimental Nonlinear Optics



## Rolland, Jannick

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



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**Interests:** Quantum Optics



## Thompson, Brian

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*Provost Emeritus*

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**Interests:** Quantum Optics; Quantum Physics



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[Website](#)

**Interests:** Molecular Beam Epitaxy; Semiconductor Optoelectronics



### Williams, David R.

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Professor of Ophthalmology  
Professor of Biomedical Engineering  
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**Interests:** The Human Visual System; Physiological Optics



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G-3184 Medical Center  
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**Interests:** Biomedical and Visual Optics; Ophthalmic Optics; Human Vision; Adaptive Optics



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Associate Professor of Biomedical Engineering  
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Associate Professor, Center for Visual Science  
Associate Dean of Education and New Initiatives  
Mercer Brugler Distinguished Teaching Professor 2018-2021  
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**Interests:** Optical Engineering; Biomedical Optical Systems



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



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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.



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### Cobb, Josh

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### Lukishova, Svetlana G.

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[Website](#)

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



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## Walters, Sarah

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## Senior Scientists

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## Post Docs & Other Professional Associates

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### Dai, Jianming

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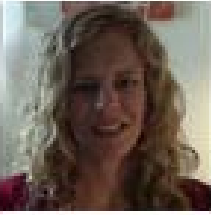
### E, Yiwen

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## Brown, Kim Hughes

*AS&E Web Project Manager*

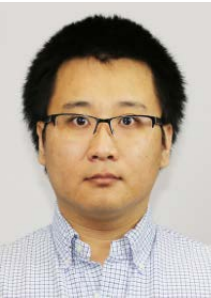
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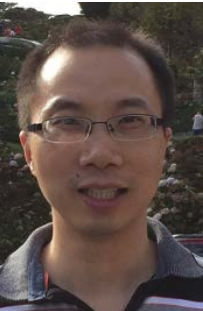
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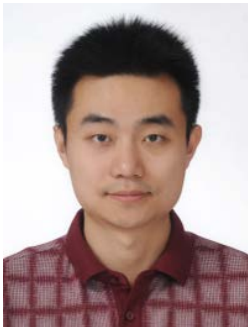


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## Graduate Students

View list of graduate students and contact information here:

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## Institute Staff

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



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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 60 student members and 32 alumni members. We promote optical science and engineering while supporting the professional development of our chapter members. To accomplish this, we regularly teach and display optical technologies to members of the Rochester community, invite speakers to visit with students on campus, and schedule tours of local optics companies.

#### Current Officers:

**President:** Nick Kochan

**Vice President:** Nick Takaki

**Secretary:** Katie Dunn

**Treasurer:** Romita Chaudhuri

**Web Administrator:** Saniat Choudhury

**Communications Officer:** Ben Moon

If you would like to host a company tour or collaborate with us on outreach or professional development events, please contact [urspie@gmail.com](mailto: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. So far this year, we have hosted or co-hosted professional development events aimed at guiding students through their academic careers and beyond, outreach events to engage with and teach optics to the campus and community at large, and social events to promote interaction between Optics students of different class years and also with students in related STEM programs. Our biggest event of the year, bringing together Institute undergraduates, graduates, and faculty, is our annual Photon Cup soccer game against the Physics department.

#### Current Officers:

**President:** Benjamin Nussbaum

**Secretary:** Stephen Chapman

**Business Manager:** Mega Frost

**Senior Advisor:** Jake Rosvold

**Outreach Chair:** Alex Wansha

**Social Chair:** Milly Bishop

Please contact Benjamin Nussbaum at [bnussbau@u.rochester.edu](mailto:bnussbau@u.rochester.edu) with any questions, comments, or ideas.




# Optics Summer Short-Course Series

## June 8-19, 2020

In 2020, The Institute of Optics will offer its 59<sup>th</sup> annual Summer Short-Course Series with a mix of a one-week courses and two-and-a-half-day courses. *Anticipated* course dates: June 8-19, 2020. The courses listed below will most likely be offered again along with a few new courses to be added. For updates and details in 2020, please continue to monitor updates at: <http://www.hajim.rochester.edu/optics/summer/registration.html>.

1. **Fundamental Concepts: June 8-10** Covering lenses, aberrations, principles of diffraction, optical systems, polarization, birefringence and crystal optics, and radiometry and detection.
2. **Applied Concepts: June 10-12** Colorimetry and vision, wave guide photonics, and more.
3. **Integrated Photonic Circuits: June 8-12** Waveguide fundamentals, passive and active devices, numerical modeling, layout, fabrication in the cleanroom and testing.
4. **Opto-Mechanical Analysis: June 8-9** Covering opto-mechanical analysis methods used to design high performance optical systems. Finite element modeling techniques for analyzing light-weight mirrors, mounts, and lens systems will be discussed. Other topics include fitting surface distortions with Zernike polynomials and the analysis of line-of-sight jitter in vibration environments. The integration of thermal and structural responses into optical software is presented.
5. **Opto-Mechanical Analysis Lab: June 10-12** Taught in a computer lab to illustrate the use of SigFit to solve a variety of opto-mechanical problems, including surface deformation, rigid body motion, active optics, line-of-sight calculations, thermo-optic and stress-optic analysis, opto-mechanical tolerance analysis, offset aperture analysis and analysis of diffractive optics.
6. **Optical Thin Film Coating Technology: June 15-19** Covering all aspects of optical interference devices including thin-film design, digital design methods, and coating and characterization.
7. **Optical System Design: June 15-19** Introduces participants to both fundamental and advanced concepts in optical system design by integrating classroom lectures with software training labs in the Hopkins Optical Design Center. 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 (June 15-16)* covers first order layout, image quality evaluation, aberration theory, optimization, and refractive/reflective design forms. *Advanced Topics in Optical system (June 17-19)* design begins with refractive/reflective design forms and then covers advanced optimization techniques, zoom lenses, aspheres, stray light analysis, tolerancing, and illumination design.
8. **Modern Optical Engineering: June 17-19** Covering optical testing and instrumentation, optical manufacturing, optical thin film coatings, diffractive optics, and glass in modern optics.

**Note:** New Summer Short Courses to be offered—details will be available in early 2020:

-  Opto-Mechanics Course
-  ½ week Quantum Course
-  ½ week Lasers Processing of Materials course

## Notes

## Notes

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