Your Commitment to Lifetime Education

- What is this?
- Why is it important?
- What opportunities are there?
- How do I do it?
NASDAQ Telecom index ^IXUT
Meet Arthur Ingalls – the first graduate of The Institute of Optics in 1932

94 years old…
Arthur Ingalls

1932

- Graduated in 1932 with BS in Optics
- Sent out 50 resumes
- Got no responses…
- Got a job at his Dad’s hardware store over the summer…
- Then in the Fall, got a call from Corning, who hired him to do spectroscopy of colored glass filters for railroad signals
- Worked at Bausch and Lomb for many years, then
- Joined the Faculty at the University of Michigan,
- Then worked at small companies and private consulting
- (note – first class to enter a brand new B&L Building-now PAS)

2004
Arthur’s Optics book collection

A lifetime of learning!
Where do our graduates go?

Faculty at top Research Universities
Leaders of Government Laboratories
Entrepreneurs
Commercial/Industrial Research Laboratories
Technical Sales
Entertainment industry
Financial/VC firms
Business Management
Patent Law
Seminary!
The importance of Professional Societies

- A Professional Family
- A Career Path that is Independent of your Job at any time...
- Reinforces your status inside and outside of the company or University or Lab...
- Awards, Fellowship, Conference Papers are all important in Employee Evaluations
- Leadership opportunities abound!
  - Be your bosses’ boss!
Opportunities for Lifetime Education: 1

- Conferences offer Short Courses

**Short Courses**

OSA Short Courses cover a broad range of topic areas at a variety of educational levels (introductory to advanced). The courses are taught by highly regarded industry experts in a variety of specialties. Some courses are offered in a traditional lecture format, and others offer students the opportunity to participate in hands-on demonstrations.

Short Courses are an excellent opportunity to learn about new products, cutting-edge technology and vital information at the forefront of your field. They are designed to increase your knowledge of a specific subject while offering you the experience of knowledgeable teachers.

OSA Short Courses are offered during the following conferences and topical meetings. Go to each specific conference website for course offerings, registration fees, and special discounts/programs for members and students. To receive a Certificate of Attendance for a previously attended Short Course, please email cstech@osa.org with your name, the course name, conference name, and year.

<table>
<thead>
<tr>
<th>Conference</th>
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<tr>
<td>Advanced Solid-State</td>
<td>16-21 November 2014</td>
<td>Shanghai, China</td>
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<td>Lasers</td>
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<td>OFC</td>
<td>22-23 March 2015</td>
<td>Los Angeles, CA</td>
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<td>CLEO</td>
<td>10-12 May 2015</td>
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http://www.osa.org/en-us/meetings/short_courses/
• **SC149**: Foundations of Nonlinear Optics  
  Robert Fisher, *R. A. Fisher Associates, USA*

• **SC157**: Laser Beam Analysis, Propagation, and Shaping Techniques  
  James Leger; *Univ. of Minnesota, USA*

• **SC221**: Nano Photonics: Physics and Techniques  
  Axel Scherer, *Caltech, USA*

• **SC270**: High Power Fiber Lasers and Amplifiers  
  W. Andrew Clarkson, *Optoelectronics Res. Ctr., Univ. of Southampton, UK*

• **SC271**: Quantum Information-Technologies and Applications  
  Greg Kanter1, Paul Toliver2; 1NuCrypt, 2Applied Communication Sciences , USA.

• **SC301**: Quantum Cascade Lasers: Science, Technology, Applications and Markets  
  Federico Capasso, *Harvard Univ., USA*

• **SC352**: Introduction to ultrafast pulse shaping--principles and applications  
  Marcos Dantus, *Michigan State Univ., USA*

• **SC361**: Coherent MidInfrared Sources and Applications  
  Konstantin Vodopyonov; *CREOL, The College of Optics & Photonics, Univ. Central Florida*

• **SC362**: Cavity Optomechanics: Fundamentals and Applications of Controlling and Measuring Nano- a  
  Tobias Kippenberg, *Ecole Polytechnique Federale de Lausanne, Switzerland*

• **SC376**: Plasmonics  
  Mark Brongersma, *Stanford Univ., USA*

http://www.osa.org/en-us/meetings/short_courses/

• **SC378**: Introduction to Ultrafast Optics
Opportunities for Lifetime Education: 2

- Summer school courses at UR, AZ etc.

54th Annual Optics Summer Short Course Series
June 1 - June 12, 2015

In 2015, The Institute of Optics will offer its 54th annual Summer School short-course series. This year’s offering will be a mix of a one-week course and two-and-a-half-day courses.

1. Fundamentals of Optics I (with labs) covering lenses, aberrations, principles of diffraction, optical systems, polarization, birefringence and crystal optics, and radiometry and detection.
   June 1-3, 2015

2. Fundamentals of Optics II colorimetry and vision, wave guide photonics, and more.
   June 3-5, 2015

3. Gradient -Index Optics (with labs) covering gradient-index optical systems, lens design tools-design
   June 3-5, 2015
Opportunities for Lifetime Education 3:
Companies offer training in specific software packages

Software Training Overview
Click on the topics for more information and to register online. Copies of the training materials for these and additional training classes are available on the Customer Support Portal.

CODE V Classes
Introduction to CODE V
March 16-20, 2015
This course covers the basics on modeling, analyzing, optimizing, and tolerancing optical systems using CODE V, including hands-on workshops. It assumes familiarity with optical concepts and terminology.
More information about the class »

Advanced Topics in CODE V

Opportunities for Lifetime Education 4: Community Involvement - Outreach

- Volunteering with community organizations
- Helping to organize events
- Educators’ Day - OSA

http://www.osa.org/en-us/membership_education/youth_education/science_educators_day/
Science Educators' Day (EDAY)

The Optical Society hosts an annual event focusing on effective and innovative approaches to science education, with an emphasis on hands-on, interactive classroom activities. This program is provided free of charge and available to youth science educators. Attendees also receive complimentary classroom materials.

2014 Science Educators' Day (EDAY)

Location: Tucson, AZ, USA
Date: 22 October, 17:00 - 20:00

Our guest speaker for the 2014 Science Educators’ Day (EDAY) event is Dr. Michael Raymer. He is a physicist and Phillip H. Knight Professor of Liberal Arts and Sciences at the University of Oregon. He was on the faculty at the University of Rochester’s Institute of Optics before moving to Oregon, where he co-founded the University’s Oregon Center for Optics. His interest in teaching began as an undergraduate at the University of California at Santa Cruz, where he co-instructed a beginning course in chemistry. Many years later he parlayed that experience into the founding of the UO’s Science Literacy Program, which is funded by the Howard Hughes Medical Institute, and which reaches across the departments of physics, chemistry, biology, and geology. His interest in teaching science literacy led him to author a textbook, The Silicon Web: Physics for the Internet Age (Taylor & Francis, 2009), to accompany a course he teaches called The Physics Behind the Internet.
Getting involved with major science and engineering festivals!

http://www.usasciencefestival.org/
Opportunities for Lifetime Education 5:

- Teaching
  - At local schools preK-12
  - At local colleges and Universities (Adjunct Faculty positions)
  - Summer short courses for high school juniors (like Drew University Governor’s School in the Sciences)
About NJGSS

The New Jersey Governor’s School in the Sciences (NJGSS) has several objectives. The first is to broaden the scholars’ appreciation and knowledge of science through exposure to a range of scientific topics and scientists. The subject of career exploration and choice is woven throughout the program. The second objective is to introduce scientific research to the scholars via hands-on research experience in a student’s area of interest. Resources from New Jersey’s industrial, governmental, and academic science establishments are used.
Photos from our October 2005 Industrial Associates Meeting

Stay involved! Stay up-to-date

Started in the early 1960s...
Summary

- There are many opportunities for you to keep your Lifetime Commitment to Education alive and active
- As you progress through your career, you will encounter many twists and turns that will require you to learn new skills, even new entire fields

The progress of the world depends almost entirely upon education.
George Eastman
What The Institute of Optics did for me:

“The optical content of most systems comprises no more than 10 to 20% of the total design. However, if the optics are not optimized for the system, the probability of success is compromised greatly. My broad education in optical engineering from the University of Rochester has been the key component in the design of numerous successful medical products.”

PhD 1969

Advisors: Dr. M. Parker Givens & Dr. Robert E. Hopkins
Dissertation: An Infrared Laser Interferometer and Its Application to the Measurement of Optically Rough Surfaces
Charles Munnerlyn

Designed the first digital device for automatically determining refractive errors in the human eye

Produced the Dioptron, the first automatic digital device to measure refractive errors in the eye.

Developed the Permitron, used to detect glaucoma.

A founding father of laser vision correction

Founded VISX, now the world’s largest manufacturer of laser-based vision correction systems.

1999 International Society of Refractive Surgery President's Honored Lecturer Award

2001 Engineer of the Year by Design News magazine.

2002 recipient of the U of R Distinguished Alumnus award

Holds 19 US patents in the field of optics.
Donald Golini

Founder & President, QED Technologies

Ernst & Young 2001 Entrepreneur of the Year

Rochester’s Top 100 Fastest Growing Companies

BS 1986
Don Golini

What The Institute of Optics did for me:

"Your first job out of college can really shape your entire professional career. A good first experience in the workplace is invaluable. The Institute of Optics provided me the credentials necessary to land a job at Ittek Optical Systems, where I learned from some of the pioneers of modern optics, including many fellow Institute alumni. A degree from the Institute of Optics opens doors and creates excellent opportunities for graduating optical engineers."

Donald Golini ‘86
Founder,
QED Technologies
Andrew Kulawiec appointed President of QED Technologies
Rochester, NY May 18, 2010

QED Technologies announces the appointment of Dr. Andrew Kulawiec to the position of President of QED Technologies Inc. Dr. Kulawiec's appointment comes after a period of transition following the announcement by our founder Don Golini in January of this year, to leave the business. Kulawiec joined QED in May, 2008 to lead QED’s metrology business and optical engineering department. Prior to QED, Andrew was Vice President of Operations for Semrock, Inc., a developer and manufacturer of high performance optical filters for the biotech and analytical instrumentation markets, in Rochester, New York. He was responsible for overall manufacturing operations for Semrock, including the design and fabrication of thin-film optical coatings and finishes, supply chain, logistics, facilities and quality. Andrew’s career spans twelve years between Corning, Inc. and Corning Tropel Corporation in New York. Andrew holds a Bachelor of Arts degree in physics from the University of California at Berkeley and a Master of Science degree and Ph.D. in Optical Engineering from the University of Rochester (New York).

“Andrew brings valuable technical expertise, strong optics experience, and proven management ability to the QED President position,” said Dan Pike, Vice President, Corporate Development for Cabot Microelectronics Corporation. “His background, demonstrated achievements and leadership will help drive QED’s strategy for continued success and future growth.”
James C. Wyant

Veeco Board of Directors 1997-1999
WYKO Corporation, President 1984-1997
Board of Directors - Chairman 1984-1997
ILX Lightwave, Board of Dir. since 1988
Optics 1, Board of Directors, since 1999
Dmetrix, Board of Directors since 2001
4D Tech. Corp., Board of Dir. since 2002
Univ. of Rochester, Visiting Prof. 1983
SPIE Fellow since 1980 (Pres. 1986, Governor’s Award, 1979, etc.)
OSA Fellow since 1977 (served on Board of Directors, Exec. Cmte., Fin. Cmte., JOSA Editor, Applied Optics Editor, etc.)
Ives Medal Committee since 1997
Associate Editor, Optics Express since 1998

Director
University of Arizona
Optical Sciences Center
What The Institute of Optics did for me:

"The Institute of Optics helped me achieve a good knowledge of optics, but more importantly, the first-rate faculty helped me acquire a passion for optics. My student years at Rochester were some of the most exciting years of my life."

Jim Wyant
PhD 1969, MS 1966
Advisor: Dr. M. Parker Givens
Dissertation: *Effect of the Photographic Gamma on Hologram Reconstructions*
Paul F. Forman

Edwin H. Land Medal for pioneering entrepreneurial creativity OSA and SIST 1998
Free Enterprise and Spirit of Achievement Hall of Fame
Junior Achievement, 1998
Special Achievement Award Connecticut Innovations, 1998
Lifetime Achievement Award, American Society For Precision Engineering, 1997
Distinction in Photonics Award, Laurin Publishing Company, 1997
Apollo Achievement Award, NASA, for the retroreflector array used on the first lunar landing
Alan Gordon Award, SPIE
Fellow, Optical Society of America
Fellow, SPIE
Westinghouse Science Talent Scholarship
Bausch & Lomb Science Scholarship

FORMAN, PAUL F.
Optics

BS Optics, 1956
Harvard Business School, PMD, 1969
Paul Forman

What the Institute of Optics did for me:
• It opened my eyes to the vast, varied, and magnificent field of optical technology.
• It allowed me to develop a vision of the lifelong role I might play.
• It taught me basic rules of optics, preparing me to be a contributor in this field.
• It facilitated the forging of lifelong friendships built on common interests.
• It enabled me to join and be active in the worldwide optics community.
• As a result, I have been able to utilize my talents and take on interesting challenges over the course of a most fulfilling career.
Stephen D. Fantone

PhD, Optics - UR -1979
(BS, EE - MIT - 1974)

Advisor:
Duncan T. Moore

Dissertation Title:
Design, Engineering, And Manufacturing Aspects of Gradient Index Optical Components
Steve Fantone

• 1982 Founded Optikos Corp.
• Senior Lecturer, MIT ME Dept.
• Chairman of the Board, Benthos, since 1997
• Member OSA since 1973
• OSA Fellow, since 1985
• OSA Treasurer since 1997
• Member SPIE since 1978
• Fannie and John Hertz Fellowship, 1975 to 1978
• Awarded over 50 patents

Stephen D. Fantone '79
Founder, Optikos Corporation
Susan Houde-Walter was president of the Optical Society of America in 2005.[1]. Susan Houde-Walter has an undergraduate degree in studio arts from Sarah Lawrence College and a Ph.D. from the Institute of Optics, University of Rochester. She became professor at the University of Rochester in 1987 and taught Optical Science & Engineering for eighteen years (1987-2005). She conducted research in the molecular structure of multi-component glasses, laser materials, and optoelectronic design[2]. She left the University of Rochester in 2005 at the rank of Full Professor to assume the role of CEO at her own company, LaserMax, Inc., in Rochester NY. She is currently president and CEO of LaserMax, Inc., a manufacturer of laser sights technology are for the military, law enforcement and civilians. She joined the College of Optical Sciences at the University of Arizona – Tucson, Arizona as Adjunct Professor in June 2005 [3].

She is Fellow of the Optical Society of America (1996) and Fellow of the American Ceramic Society (2000).
Michael Morris received his B.S. degree with Special Distinction in Engineering Physics in 1975 from the University of Oklahoma and his M.S. and Ph. D. degrees in Electrical Engineering from the California Institute of Technology in 1976 and 1979. From 1979 to 1982, Morris was a Scientist in Optics at The Institute of Optics, University of Rochester. In 1982, Morris joined the faculty at The Institute of Optics. To date, he has supervised 22 doctoral thesis projects and five Master of Science theses.

In 1989, Morris co-founded Rochester Photonics Corporation (RPC), which specializes in design, prototyping, and manufacturing of diffractive- and micro-optics components and subsystems. In 1999 RPC was acquired by Corning Inc., and now functions as a wholly owned subsidiary of Corning Inc. Morris is currently serving as RPC's Chief Executive Officer.
Brian F. Prince

BS 1986
(Optics)
MBA 89
(Simon)
Brian Prince

Giver of largest University gift ever by an individual under the age of 40 - $2 M to U of R to start a fund that promotes democratic principles and open markets.

Senior financial advisor for Canadian American Transportation Systems.

Brian Prince ‘86
CEO, Shinsei Bank Ltd.
Dr. N. Darius Sankey, Partner

Dr. N. Darius Sankey is a Managing Director at Zone Ventures, a seed to early stage venture capital firm based in Los Angeles. Dr. Sankey has led the Zone Ventures technology assessment efforts and overseen its portfolio investments for over eight years, serving as a board member for several companies including Siimpel Corporation, Lumexis, Inc. and Microfabrica and Neven Vision (Acquired by Google). He has led several transactions in the micro electronics, wireless telecommunications, media & entertainment, and business & consumer software sectors. Dr. Sankey has a strong interest in strategizing market applications for basic science research on the university level. This interest has also led him to a position as adjunct professor in the Marshall School of Business at the University of Southern California. Before his tenure at Zone Ventures, Dr. Sankey worked as a management consultant at McKinsey & Company, Inc. and held strategic planning, consulting, and R&D positions at RAND and AT&T Bell Laboratories. Dr. Sankey holds a B.S. in Physics and Electrical Engineering from MIT and a Ph.D. in Optical Engineering from the Institute of Optics, University of Rochester.
Welcome back, Wade Cook
US Army 10th Mountain Division

Maj. William Wade Cook of Brighton embraces his wife, Annemarie, on his arrival Wednesday at the airport. “There’s nothing like being home,” said one reservist. At least 100 family members and well-wishers were on hand to welcome the 40 Army reservists home from Afghanistan. [Day in Photos]
Write a 5 minute essay on the following topic:

- Is it important to keep your education alive and updated? How might it be important to advancing your career? What are some examples of ways that you can keep your education advancing after starting work?