Revised OSSC eNewsletter - February 2020

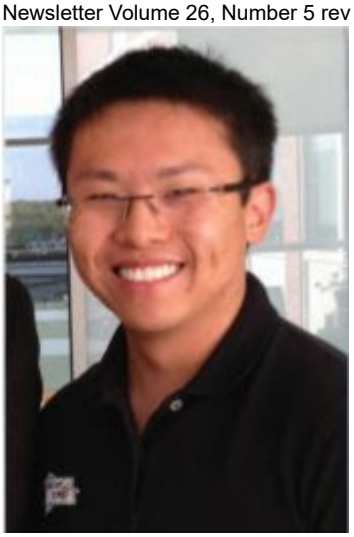
1 message

Donn M Silberman (OpticsAge@gmail.com) <mailer@mail2.clubexpress.com> Thu, Feb 13, 2020 at 3:51 AM
Reply-To: Donn M Silberman <OpticsAge@gmail.com>
To: OpticsAge@gmail.com

Optical Society of Southern California

IMAGES Newsletter

Newsletter Volume 26, Number 5 rev 1 February 2020



In This Issue:

16. Optics Outreach
17. Welcome New OSSC Members

From the President:

Dear OSSC Members,

As we embarked on another yearly pilgrimage to Photonics West, I want to first say I would like to wish everyone safe travels as we gathered together for our industry's biggest event! Students, scientist, business leaders, engineers, and everything in between, I hope all of us had a productive trip!

I first want to thanks our speaker last month, Kurt Ponsor, President of Mindrum Precision for his great talk at St. Gregory's Armenian Church in Pasadena. I want to make special note that Mindrum Precision, a manufacturer of high precision components, located in Rancho Cucamonga is one of the OSSC's strongest corporate supporters, and is a prime example of the strength of the OSSC's stable of corporate members. Corporate membership is one of the best ways for your company to get your products/services in front of the movers and shakers of the Southern California Optics/Photonics community, and receive benefits such as social media promotion, promotion on our website, a table at our annual corporate appreciation meeting, among other benefits. Mindrum and other great corporate members will be out in force at Photonics West, so be sure to look for them and others!

I want to take a moment to reflect upon where we are as an industry as we (and our global economy as a whole) are at a crossroads. A confluence of political, technological, social, and economic factors are all bearing down on our industry, and the way that we navigate these challenges will be the key to our success in the future. One issue that I want to address (and for us as an industry to have a clear eyed view about) is the impending creep of automation, and how it is poised to have a major impact on how we operate in the future. As I have walked through the halls of the Moscone Center the past few years, what has become self-evident is the growing prevalence of robotics and artificial intelligence making its presence more pronounced, upping the ante for all those involved. I know that these are difficult questions to address, and I'm pretty sure that no one has a complete solution, but it is up to us (the men and women who make up this optics and photonics community) to be vigilant as we face this uncertain future together.

Our next meeting (the week after Photonics West) will be at the Joint Forces Training Base in Los Alomitos, and will feature Dr. Michael Sholl from SpaceX as our speaker. Dr. Sholl will be giving a talk on the "Supernova Acceleration Probe (SNAP) Studying Dark Energy in the Universe". Please visit our website for more information, and to sign up for this great talk!

Again, I want to wish everyone heading up to Photonics West safe travels, and I'm looking forward to seeing all of you there!

Sincerely,

Bo Wang

President, 2019-2020

Wednesday 12 February

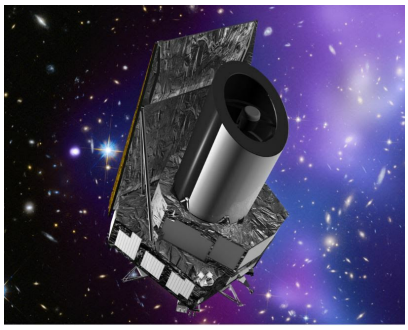
The Supernova Acceleration Probe (SNAP)
Studying Dark Energy in the Universe

by

Dr. Michael Sholl, SpaceX

About Our Speaker: Michael Sholl earned his Ph.D. in Fluid Dynamics from the University of California at Berkeley in 1995. He was Project Manager of the Orbiting Far and Extreme Ultraviolet Spectrometer (ORFEUS-II), which launched on Space Shuttle Columbia in 1996. Sholl worked on multiple programs at Lockheed Martin Missiles and Space, including the Trident-II missile and the Airborne Laser wavefront control system. From 1998 to 2003, he was Project Manager and Chief Engineer of the NASA/Berkeley Cosmic Hot Interstellar Plasma Explorer, the first, and only NASA University-Class Explorer mission. Subsequently, he was DOE Optics and Straylight Lead Engineer for various dark energy missions, including SNAP, JDEM and WFIRST. Sholl performed optical design trade studies for a prime focus corrector that led to the DESI project, which is currently being commissioned on the Mayall Telescope at Kitt Peak. Sholl was Propulsion System Lead Engineer for the five hydrazine propulsion systems on the

NASA/Berkeley THEMIS mission, which launched in 2007. Two of these probes are currently operating in lunar orbit. More recently, he performed optical design, stray light analysis and systems engineering on Google air and spaceborne imaging projects, as well as laser communication and glare reduction for the Google self-driving car cameras. Sholl is currently Principal Optical Engineer at SpaceX, and he works on the Starlink satellite constellation.



Abstract:

The Supernova Acceleration Probe (SNAP) was a proposed experiment designed to quantify dark energy by measuring the redshift-magnitude diagram of supernovae and to quantify the growth of structure in the universe by measuring weak gravitational lensing over cosmological distances. These techniques, along with baryon acoustic oscillation, are used to constrain dark energy density and matter density in modern cosmological models. The baseline SNAP telescope was an ambient temperature, annular-field, configuration II Korsch, three-mirror anastigmat (TMA), designed to fly at the L2 Earth-Sun Lagrange point. The SNAP project evolved into the Joint Dark Energy Mission (JDEM), and finally the Wide-Field Infrared Survey Telescope (WFIRST). Stray light analyses of the SNAP telescope included both overall systems engineering and budgeting, and detailed non-sequential modeling of the effects of dust, roughness and thermal infrared emission, as well as stop placement and baffle design. The goal of the stray light design was to ensure that stray light in the 0.4 to 1.7 micron wavelength range did not exceed a small fraction of Zodiacal radiation within the mission's target field near the North ecliptic pole. At visible wavelengths, the primary source of stray light was starlight scattered by the telescope mirrors. In the longest wavelength bands, thermal emission from the mirrors and structure dominated the budget. Scattered stray light and thermal emissions were mitigated by baffles, an internal field stop, and a cold (140K) internal aperture stop. Stray light scattered by mirror roughness and particulate contamination, as well as scattering from the telescope baffles, were modeled and shown to be less than 10% of Zodiacal levels in all bands

Venue:
Joint Forces Training Base MWR
Building 19 (Militia Room)
4748 Yorktown Ave
Los Alamitos, California 90720
Reception: 6:00pm
Dinner: 7:00pm
Members: $35 **Non-Members:** $40
OSSC Student Members: $10
Presentation: 8:00pm
Please register by 8 February
to avoid $5 late registration fee!
Registration & Additional Details
Download the flyer to share with friends and colleagues!

This meeting is also posted at:
https://www.meetup.com/SoCal-Science-Cafe/events/
check out their other events too!!

Upcoming VOSA Meeting
Wednesday 12 February

Historical Examples of Politics, Morality, Innovation and Fraud in Physical Science and Technology

by

Jed Buchwald Caltech History of Science Professor.

Abstract: The pressures of politics, the desire to be first in innovation, moral convictions, and the potential dangers of unwitting error are all factors that have long been at work in the history of science and technology. Historians think and argue best through stories, so I've chosen several tales to tell each of which exemplifies one or more of these aspects, though some reach back nearly 200 years. The first is the most recent and concerns the depletion of the ozone layer; the second involves the discovery of electric waves by Heinrich Hertz in 1888; the third concerns the controlled production of electromagnetic radiation by Marconi and Fleming in the early 1900s; the fourth portrays the circumstances surrounding Fraunhofer's discovery and use of the spectral lines in the 1810s; our final case involves a bitter controversy between the physicist Hermann von Helmholtz and the astronomer Friedrich Zöllner in the 1890s.

Venue: Laritech, Incorporated
5898 Condor Drive
Moorpark, California 93021
805/529-5000rsity
6:00pm - Mixing and Stand Up Dinner
7:00pm - Speaker
Cost: $25
(it is a donation for food, insurance and venue.
If you need a no-food, student, old age or other discount,
please give yourself one).
Please RSVP to John McDonald, "john@latigooptics.com"
(for food estimate – last minute walk-ins are completely welcome)
Download the flyer to share with friends and colleagues!

From the Editor:

Hello OSSC members and fellow readers,

In this issue of the OSSC's Images eNewsletter, we have a number of interesting articles to offer in addition to the regular sections. Our friends at the UC Irvine Optical Engineering & Instrument Design programs are seeking your thoughts for their Five (5) Year Review. There will be a Quantum Computing MeetUp on Feb 24th in Pasadena hosted by Doug Finke, the Managing Editor of Quantu Computing Reports. Our friends at Precision Optical in Costa Mesa celebrated their 60th year in operation a couple months ago and they are sharing some photos of their party.

The OSSC and the So. Cal Optics community has been invited to participate in the International Science and Engineering Festival in Anaheim in May; this will be an amazing Outreach opportunity. And a new friend from Sacramento, Tom Scheffelin, is proposing an Optics / Laser / Photonics Scout Merit Badge.

On the art & science side of optics, Martin Hagenbuechle shared an article / research topic that has come from UC Irvine. Discussing a work of art / optics of Leonardo da Vinci. This harkens back some years ago when we had talks on whether or not the great masters used optics tools to create famous paintings.

And we end the special contributions sections with some notes and mirror work by Dr. Murty.

There are a couple follow ups at the end, one on the Photonics Online Meetup and the other on the Webinar from Photonics Media & PI (Physik Instrumente).

Next month I hope to have some contributions from the Photonics West Conference and we will look forward to OFC in San Diego, the second week in March and the SPIE Defense & Commercial Sensing (D&CS) Conference in Anaheim the last week in April. OSA is seeking volunteers from the OSSC for the OFC conference and eLas Americas + UC Irvine + OSSC will have a Table Top exhibit at the D&CS conference. So put these events on your calendar.

On a personal note; I am missing seeing you all in person lately due to schedule conflicts at work. I am happy to say that these are all on the good side as our business at Starrett Kinemetric Engineering has picked up much more than we had anticipated. A good problem to have; but it takes time. I am glad to be able to keep these eNewsletters on track and hope you are enjoying them.

The OSSC Leadership Team has several OPEN Volunteer Positions that we would like to fill. Scroll down to the list of OSSC Leaders and let us know if you are interested in learning more about serving your Society.

Hope to see you at an OSSC event soon.

Sincerely,

Donn M. Silberman

OSSC Past President & Fellow

Current OSSC Newsletter Editor

UCI Division of Continuing Education

UCI Optical Engineering 10 yrs - Photonics Spectra from Sept 2019 Photonics Spectra Magazine

The following courses are part of **Certificate Programs** in:
Optical Engineering and **Optical Instrument Design**
There was an Information Session - Monday 19 August
OSSC Fellow Donn Silberman was the guest speaker.
Recorded Session Here
Spring 2020 courses will begin in Mid April:
Geometrical and Physical Optics
Introduction to Lens Design
Introduction to Lasers
Vibration Control for Optomechanical Systems
Introduction to Radiometry

Five Year Program Review in progress now - your input is requested.

What are the current trends in the industry that you see emerging that are going to change the way we look at Optics?

What are some things we can be doing for future

IRVINE VALLEY COLLEGE

PHOTONICS TECHNOLOGY

Laser and Photonics Technology instructors lead hands-on, laboratory-driven classes, utilizing state-of-the-art industrial equipment, based on the industry-guided photonics curricula written by industry professionals. In addition to laboratory skills, students are offered one-on-one support and career advice, including résumé and LinkedIn profile building.

Program Website

***IVC Laser Technology** is located on the*
IDEA at **ATEP** campus in Tustin, CA
For Information Contact:
Prof. Brian Monacelli, Ph.D.
949-824-2704
IVCphotonics@ivc.edu

outreach?

We are also looking for either one person or a group of people to do a lunch time webinar series (3-4) over a year period of time on Hot and Trending Topics in Optics. If you may be interested in doing this please let me know. We want to serve the local community along with our student groups in the programs through these. Please email your thoughts directly to: Jennifer Spitzer Mortensen j.mortensen@uci.edu

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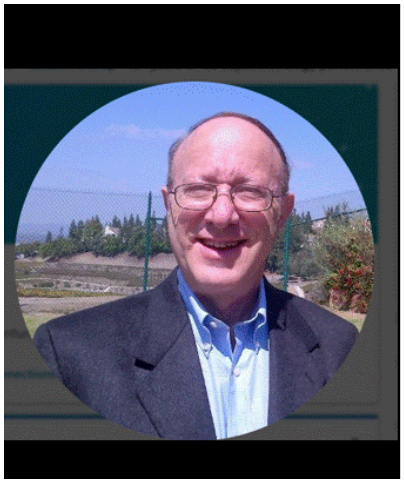
Past UCI Optical Engineering Webinars

UCI DCE Financial Aid for Optics Programs
Go to the links above to learn more about the courses and programs.
*15% discount for **OSSC** Members on courses Required for a Certificate.*
Email: **Kadie Heck**
with confirmed **OSSC** Membership
to receive discount code.
Instructors Wanted to Teach:
Optical Engineering and Optical Instrument Design!



QUANTUM COMPUTING REPORT

WHERE QUBITS ENTANGLE WITH COMMERCE

Doug Finke, Managing Editor

Doug Finke has been involved in the computer, semiconductor, and storage industry for over 30 years and has witnessed and helped drive the birth and growth of many new technologies during this period. He has most recently become fascinated with quantum computing and believes that many of the new technology growth patterns he has seen within the computer industry will reoccur as the quantum computing field evolves. He started the Quantum Computing Report so he could apply his wide breadth of experience to help accelerate the proliferation of quantum computing to the general marketplace.

Southern California Quantum Computing Meetup Event on February 24th in Anaheim

We are having another Southern California Quantum Computing Meetup event on February 24th from 6-8 PM at the Ayres Hotel in Anaheim and everyone is invited. **We would appreciate it if you could pass this on to any of your students and colleagues who may be interested.** Refreshments will be available and there is no charge to attend.

The focus of this meeting will be on quantum hardware implementations. Our first speaker will be Joe Hellmers of Dassault Systèmes who will speak on the multiple hardware methodologies that are being developed for quantum computing including superconducting circuit, ion trap, spin quantum dot, linear optic, and nitrogen vacancy diamond and topological approaches. Our second speaker will be Cristina Escoda, the President & COO of UK based quantum startup ORCA Computing, a company building a scalable and flexible quantum computer powered by photonics.

The Ayres Hotel in Anaheim is at 2550 E. Katella Avenue in Anaheim. It is across the street from the Anaheim Artic train station so it is an easy train ride from LA or San Diego or points in-between. The hotel is also next to the 57 Freeway and provides free parking for those driving.

Additional details are available on the Meetup web page at https://www.meetup.com/Southern-California-Quantum-Computing-Meetup-Group/events/267757137/. If you have additional questions about the event, you can direct them to Doug Finke (dfinke@quantumcomputingreport.com). We look forward to seeing you there and expect to have a very interesting evening!

Precision Optical Celebrates 60th Anniversary with Employees, Friends, Family and Industry

By Nicolaus Lambert

On Dec. 13th 2019, long-time supporter, sponsor and participant of the OSSC, Precision Optical celebrated its 60th anniversary with friends, family, employees and esteemed guests including industry representatives. All guests were warmly welcomed to an evening of great food, wonderful ambiance, decorative style, nostalgia and fun entertainment. Industry representation included Ohara Corporation, United Lens, JC Machine, SSI, G&C Tech, DNV, and Waxie. Supplier of the year and the Precision Optical founders award (employee of the year) were acknowledged at the event.

In addition to 60 years of continuous operation, the event was also celebrating a 1000 years of current employment. This is remarkable history and tenure, particularly given the company is currently (and efficiently) operating with 70 employees.

Precision Optical manufactures some of the most challenging plano/ultra-flat optics, coatings and assemblies in the world. From deep-UV lithography, to IR telescope applications Precision Optical is constantly asked to build what has never been built before. The company's commitment to excellence is personified by its commitment to its employees. And this celebration was an effort to acknowledge those employees. Click on the link to see more Photos from Precision Optical 60th Party.

Precision Optical is currently hiring and is interested in optical technicians and engineers. Please contact or submit resumes to careers@precisionoptical.com for more information

SOCIETY FOR SCIENCE & THE PUBLIC

Be a Judge at Regeneron ISEF

Learn more about Grand and Special Awards judging. Apply to be a judge at ISEF 2020.

Volunteer at Regeneron ISEF

Thousands of individuals contribute to and support Regeneron ISEF as interpreters and event volunteers. Learn more and volunteer.

Regeneron ISEF 2020

Regeneron ISEF takes place May 10-15, 2020, at the Anaheim Convention Center in Anaheim, California. Get the basics for attendees.

The International Science and Engineering Fair 2020 is the Olympics of STEM and it is coming to Anaheim this year.

Our friend, Kumar Ramajayam, Founder & Chief Education Officer of Bytes & Bots,https://bytesandbots.com/ is one of the co-chairs of the Local Arrangements Committee he is reaching out to some of our SoCal based community organizations and leaders seeking their support in recruiting Judge volunteers for the competition.

WHEN: MAY 10-15, 2020,

WHERE: Anaheim Convention Center

In May 2020, more than 1,800 students representing 80 countries, regions, and territories will be in Anaheim to compete for more than $5 million in awards, scholarships, internships and prizes. These high school students are the top winners of regional, state and national science fairs from around the United States and the world. Typically the event rotates among three cities in the USA: Los Angeles, CA., Pittsburgh., PA, and Phoenix., AZ. For the first time it is coming to Anaheim in 2020 replacing Los Angeles.

Call for Judge volunteers!

Southern California STEM professionals are needed to judge ISEF finalist projects on Tuesday, May 12th evening and Wednesday, May 13th all day. We need practicing STEM professionals such as scientists, engineers, doctors, and professors to judge in the following subject categories… 1400 of you are needed!

> Animal Sciences
>
> Behavioral and Social Sciences
>
> Biochemistry
>
> Biomedical and Health Sciences

> Biomedical Engineering
>
> Cellular and Molecular Biology
>
> Chemistry
>
> Computational Biology and Bioinformatics
>
> Earth and Environmental Sciences
>
> Embedded Systems
>
> Energy: Sustainable Materials and Design
>
> Engineering Mechanics
>
> Environmental Engineering
>
> Materials Science
>
> Mathematics
>
> Microbiology
>
> Physics and Astronomy
>
> Plant Sciences
>
> Robotics and Intelligent Machines
>
> Systems Software
>
> Translational Medical Science

- **Learn more and apply to serve as a Grand Award judge here:** https://www.societyforscience.org/isef/judging/.

Documentaries and Highlights videos:

Inventing Tomorrow Trailer: https://www.youtube.com/watch?time_continue=4&v=PzTj1h1sxEw

Science Fair Trailer: https://www.nationalgeographic.com/films/science-fair/

ISEF 2019 Highlights video: https://www.youtube.com/watch?v=NbcbU0aZ678

Volunteer Video: https://www.youtube.com/watch?v=GCmipBmhNg0#action=share

It is a great opportunity to give back by supporting our budding young scientists and innovators! ISEF is the Olympics of STEM competitions!

Read More Here

Proposed Optics/Lasers/Photonics Scout Merit Badge

Tom Scheffelin tscheffe@gmail.com

Background

Seven years ago I knew very little about lasers, but I was fascinated by what they could do. Now I know more, but not nearly enough! I began reading laser-related magazines, such as Photonics Spectra, Laser Focus World, and Optics & Photonics (three of my favorites). In 2014 while reading Laser Focus World I discovered 2015 would be the International Year of Light. I mentioned this to Mrs. Sloss, my son's 6th grade science teacher. She and I formed a Photonics Club for the middle school students at her K-8 school. The club met weekly that year and the next, on Tuesdays during lunch. We set up laser and optics experiments, watched videos, and sometimes took apart small appliances (such as clocks or microwaves). Hand tools are the best!

We contacted the University of California at Davis Optics Club. The Optics Club allowed us the opportunity to participate in the UCD annual Picnic Day. On tables (outside) we set up hands-on photonics materials, such as polarizing filters and plastic CDs, as well as a Lego robot controlled by color sensors. Many people visited our tables. However, the Lego robot's color sensors did not correctly work in sunlight. Imagine that! (We programmed the robot indoors.)

Read the entire article from Tom here Proposed Optics / Laser Scout Merit Badge

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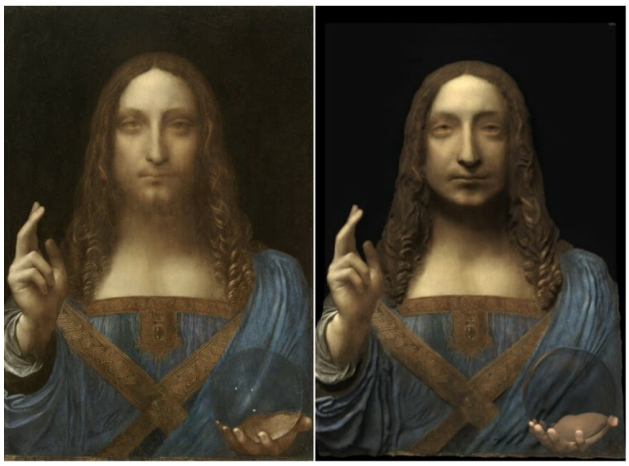
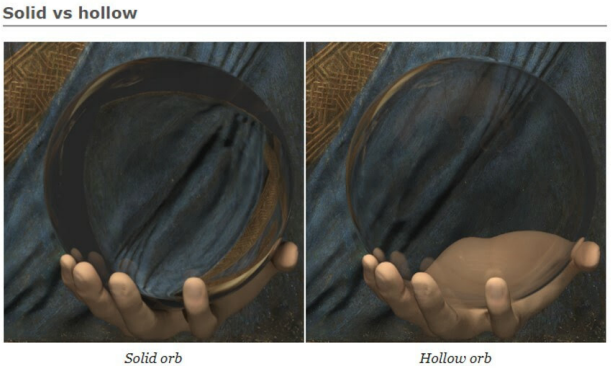
On the Optical Accuracy of the Salvator Mundi

Marco(Zhanhang) Liang, Michael T. Goodrich, Shuang Zhao
University of California, Irvine





From Science Alert via OSSC Fellow /Treasurer Martin Hagenbuechle we have:

Scientists Have Solved One of History's Weirdest Leonardo da Vinci Mysteries

DAVID NIELD
8 JAN 2020

Scientists may have solved one of the great Leonardo da Vinci painting mysteries – why the glass orb in the *Salvator Mundi* painting (dated to around 1500 CE) shows no signs of the refraction and reflection of light that might be expected.

Here is a link to the Science Alert reference.

Here is the link to the original paper: https://arxiv.org/abs/1912.03416

Here is a link to the author's brief and more info: https://www.ics.uci.edu/~zhanhanl/web_files/projects/salvator_mundi/salvator_mundi.md.html

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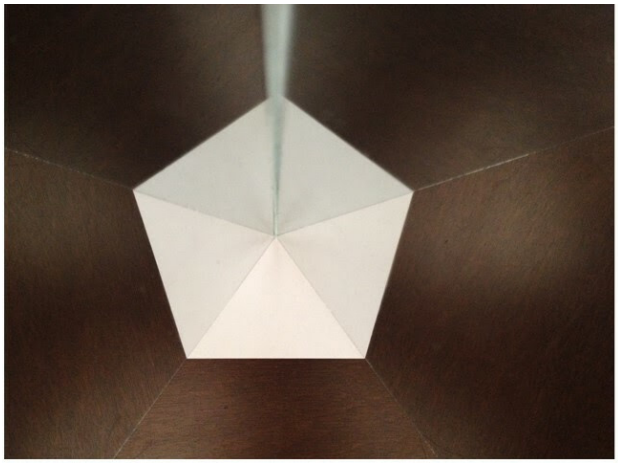
Murty playing with the plane mirrors forming a variable wedge.



Regular pentagon - the angle is 72 degrees.

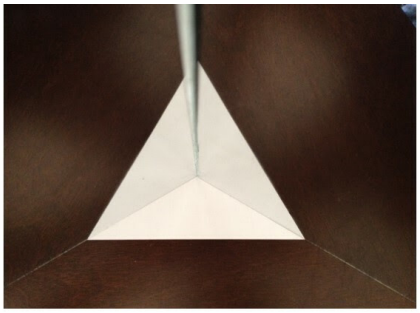
Regular polygons by Murty Mantravadi

Here you see the figures of regular polygons created by the use of two plane mirrors hinged to form a variable angle wedge. By changing the angle, we can create all the regular polygons starting from the equilateral triangle.

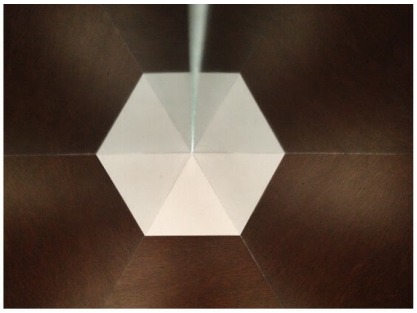
The general rule is for an N-sided regular polygon, the angle between the mirrors is 360/N degrees. For the above regular pentagon, the angle is 72 degrees. I may bring this to the meeting on Feb 12th and demonstrate.

Of course, I gave you only regular polygons which are obtained when a straight line is placed so that an isosceles triangle is formed. If the triangle is not isosceles, you will get star like polygons. This is a kaleidoscope with a variable angle. You will get N-symmetry figures with the angle between the mirrors 360/N degrees.

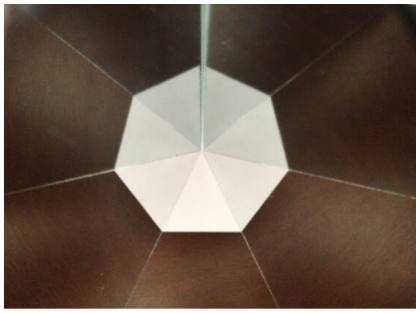
The model I made is of two small mirrors. I am visualizing a larger model for a Science Museum with mirrors of 3 ft X 5 ft with mechanism to change the angle continuously from 0 to 120 degrees.



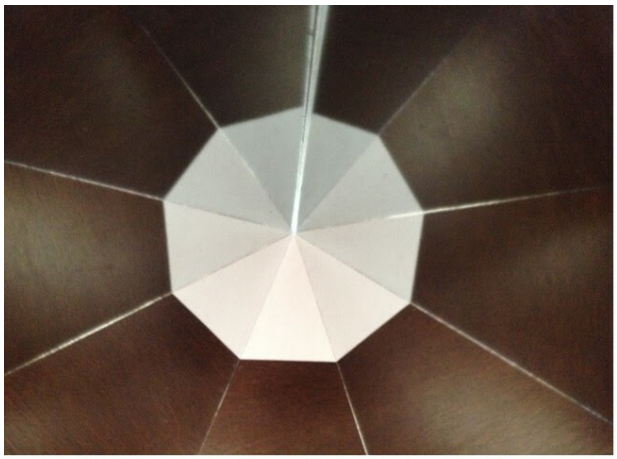
Equilateral triangle - Angle between the mirrors is 120 degrees.



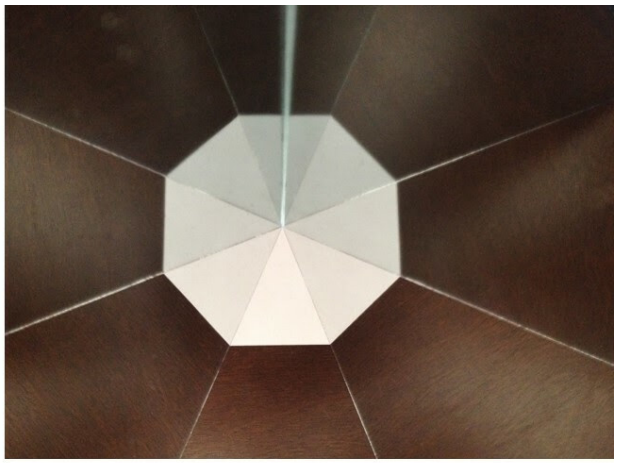
Hexagon - Angle between the mirrors is 60 degrees.



Septagon - Angle between the mirrors is 51 and 3/7th degrees



Nanogan - Angle between the mirrors is 40 degrees.



Octagon - Angle between the mirrors is 45 degrees.

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PI
MOTION | POSITIONING

Photonics Media & PI (Physik Instrumente) hosted a live webinar last month....

Advancements in Precision Motion Control for Electro-Optical Manufacturing and Laser Materials Processing if you missed it live and want to watch it now click on the link https://www.photonics.com/Webinars/Advancements_in_Precision_Motion_Control_for/w204

Scott Jordan is head of photonics for PI and a PI fellow. A physicist with an MBA in finance/new ventures, Jordan has made multiple contributions to photonics alignment automation and precision motion control and optimization technologies.

Matt Price is a technical manager for PI, working in precision automation technologies for microfabrication and metrology. A physicist with a background in laser materials processing and characterization, he has contributed to the development of motion technologies to advance capability in these fields.

POM
Photonics Online Meetup

The inaugural Photonics Online Meet-up (POM) happened last month,

the first all-online conference for photonics researchers!

Follow @PhotonicsMeetup or #POM20!

USC University of Southern California

This information came to the OSSC from Prof. Andrea Armani from USC.

Photonics Online Meet-up (POM) took place on Jan 13th (Monday) from 11am-4:30pm. The three keynote speakers are Prof. Nader Engheta, Prof. Mete Atature, and Prof. Mercedeh Khajavikhan, and their talks will be

Check out some results on Twitter here.

#POM20

accompanied by additional shorter presentations. The complete program is available at https://sites.usc.edu/pom/program/.

There were videos online for about 1 week and then taken down. You can contact Prof. Armani at USC here https://armani.usc.edu/

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Website Sponsors are *Corporate Members* that make an additional donation to support the **OSSC.ORG** website. They enjoy all the benefits of *Corporate Membership* AND have their company logo and link prominently displayed along the left side of our website. Website Sponsorship dues are $200 per year.
New Members may select the Website Sponsor option when applying for membership using the link below.
Current Members may select the Website Sponsor option when renewing their membership during the April to June renewal period or at other times by contacting the Membership Chair.
All Website Sponsors may contact the Website Team to add or update their company link or logo or to resolve other website issues.
For general membership questions, please contact the Membership Chair.
Become a **Corporate Member or Website Sponsor!**

Corporate Members

OSSC Corporate Members display their products at the December 2012 Corporate Member Appreciation Meeting.

Corporate Members benefit the **Optical Society of Southern California** through their generous donations of time, talent and financial resources. Corporate Membership dues are $100 per year.

Aerotech
Alluxa
AMP Optics
Äpre Instruments
AVS Southern California Chapter
AWI Industries
Cambridge Technology
Cimarron Optical Consulting
Collins Optronics
Curt Deckert Associates
Diverse Optics
DMK Engineering
e-Las Americas
Facebook Connectivity
4D Technology
Guernsey Coating Laboratories
Hadland Imaging
Infinite Optics
Inrad Optics
Isuzu Glass
Laser Components
Mahr
Mark Optics
Mendez R & D Associates
Micro Laser Systems
Mindrum Precision
Newport Corporation
Newport Thin Film Laboratory
Ohara Corporation
Optic Systems Group
Optikos
OptiPro Systems
OptoSigma
Photonics Media
Physik Instrumente
Precision Glass & Optics
Quartus Engineering
Raytheon ELCAN Optical Technologies
Raytheon Space and Airborne Systems
Reynard Corporation
Schott North America
Silicon Lightwave Technology
Spectrum Scientific
SPIE
Starrett Metrology
Supply Chain Optics
Synopsys
Trioptics
II-VI Optical Systems
UC Irvine Division of Continuing Education
Zemax
Zygo

CONFERENCES AND SEMINARS

This list of OSA Student Chapters in California is current as of Jan 1, 2020.

The OSSC Board would like one volunteer to reach out one of these OSA / SPIE Student Chapters and become a contact that one college or university student chapter and optics community. Please contact Donn Silberman if you would like to v

- California Institute of Technology - OSA Student Chapter
- Cal Poly Pomona Optics & Photonics Club
- Stanford University, Stanford Optical Society
- University of California, Berkeley, "PhotoBears" (Joint OSA, SPIE & IEEE Student Chapter)
- University of California, Riverside, Photonics Society (Joint SPIE & OSA Student Chapter)
- University of California, San Diego, Light Quantum at UCSD
- University of California, Santa Barbara, Photonics Society, (OSA, SPIE & IEEE Student Chapter)

- Irvine Valley College (IVC) Student Chapter (not active)
- San Francisco State University, OSA Student Chapter (not active)
- University of California, Davis, Optics Club (not active)
- University of California, Irvine, Photonics@UCS (Joint OSA & SPIE Student Chapter) (not active)
- University of California, Los Angeles (Joint OSA & SPIE Student Chapter) (not active)
- University of California, Merced (not active)

Outreach

Left: Dr. Murty Mantravadi demonstrates his Optricks! Right: Children play with home made telescopes.

The **OSSC** supports several outreach events each year. If you would like to **volunteer** to help on a project or event, please contact **OSSC** Outreach Chair - Nick Lambert, or any member of the Outreach Committee

The OSSC Optics Outreach Programs have had a long history of success over many years. At this time we are looking forward to bringing on a new outreach leader, Anthony E. Oceguera, from Cal Poly Pomona's Optics & Photonics Club, who will help us continue reaching many young people around Southern California. Please welcome Anthony and volunteer to help him create successful programs for the next year and beyond.

WELCOME NEW MEMBERS

V. Ara. Apkarian
Travis R Brashears
Yan Cheng
Denise Durance
Steven L Ernst
Andrew J Froning
Jun Huang
Srinath Karat
Zainuddin Karriem
Eileen Klabunde
Nadhir B Kosa
Juan Lozano
Anise E Mansour
Cody Miller
Keith E Mitchell
Erik Muniz
Michael P Newell
Mikhail Ovchinnikov
Arun Panneerselvam
Bill Perkins
Gopal Salvady
Nicholas A Schram
Gokce Toprak
Julian E Vimont

OSSC*welcomes***Individual***and***Corporate***
Members who joined (or rejoined) in the last 60 days.

We value your membership
and appreciate your support!
