PTICAL SOCIETY
OF SOUTHERN CALIFORNIA

IMAGES

Newsletter volume 14, number 9 WWW.OSSC.ORG June 2008

From the President
Donn Silberman

This is a bit of sweet and sorrow time for me personally, as I write my last column as president for the OSSC. As you know, it has been such a pleasure for me to serve this society as a volunteer and elected officer and I hope you have enjoyed my time here with you. (Not that I will be going away… but you know what I mean!!)

Our May meeting was (in my humble opinion – IMHO) a great celebration of our society, by establishing five of our distinguished members as Fellows and opening the doors to honor more in the years to come. I suppose it was all the more sweet for me (again personally) as these people are my friends whom I have know for many years. But this is not an end, but a moment in time on a progression that includes many wonderful events and moments yet to come. The OSSC has many more such distinguished friends who are now reading this article. The current OSSC Officers and volunteers are among the best and brightest I have ever had the pleasure of working **with**; each with unique strengths (and of course weaknesses). Together, we will continue to do the work of the OSSC and fulfill our Aims and Goals.

From left to right: Fellows Chair Al Hathaway, Arnie Bazensky, Susan Rico, **Historian** Tom Godfrey, Murty Mantravadi, Don Wolpert, Reddy Chirra and President Donn Silberman (yours truly).

Another piece of the May meeting that was a nice added touch was the opportunity for our Corporate Members to sponsor tables at this event and receive recognition on their tables and on the Fellows Induction Booklet passed out to all attendees. This too will continue. You can see these sponsors logos on page 7 of this newsletter.

A look back in time

As this year draws to a close I'll take a moment to reflect. Twenty five years ago in May of 1983, I graduated from the Univ. of Arizona with a B.S. in Engineering Physics. I was already an optics and laser guy and was finishing my second year as President of the U of A chapter of the Society of Physics Students. In Oct. of 1982, I had the honor of hosting a special talk at the OSA's Annual Meeting in Tucson; the presenter was Prof. Nick Woolf and the topic was the first MultiMirror Telescope (MMT). It was standing room only. I still use the yellow key fob from that meeting to keep track of my Zemax key!!

I mention this background at this time because the OSSC has worked with the local OSA student chapters at Cal Tech and UC Irvine and we are working with some good people at UCLA to see about starting a new chapter there. Like myself, there are many OSSC members and volunteers who had their society beginnings during their school years where they found their student chapters a great benefit to their careers and futures and now look to give time and effort back to the optics community.

Looking back over this OSSC year, I believe, with some bias, that it has been a banner year. Beginning with that very special talk by Prof. Emil Wolf, we then included four meetings at local universities; our 5th Annual Optricks Days event plus at least 6 other educational outreach events; the improvements in this newsletter, the induction of five fellows, and of course our Annual (now named Fred Hansen Memorial) Golf Tournament.

There's not much more to say, as I once again run out space at the bottom of this column; so I'll end by saying, "Be Well, Do Good Works and Keep in Touch".

In This Issue **Page**

PTICAL SOCIETY
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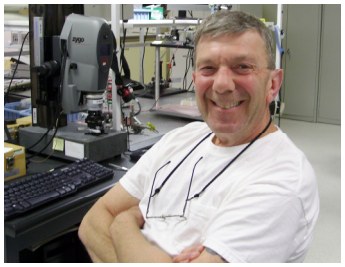
From the Board

From Jeff Padgett, Councilor

A method for building a lithographic projection lens



The technique to be described has been proven to be an efficient and precise process used to build projection lenses.

A custom built vertical lathe is used for machining the lens seats within the lens cell. It is mounted on granite, has an air-bearing spindle, and is vibration isolated. It also has a "pencil beam" Michelson interferometer mounted on it. The cutting tool is a PCD (polycrystalline diamond) insert, which yields a very clean sharp edge for the surface of the lens to sit on. The lens cell is stainless steel; the lens seats are brass inserts.

The following description is for a seven-element lens in two cells assembled as one, yet it is typical for lenses of different applications, i.e. ablation tools, steppers, and scanners.

The lens cell is mounted onto the air bearing and centered with an electronic indicator. The first seat is machined to a particular number, which is derived from the lens prescription. The top of the seat is machined flat and the ID machined for a convex surface or the OD for a concave surface. The edge of the seat formed by the ID/OD and face will run true to the air-bearing axis and will center the bottom surface of the lens. The lens is dropped in and the tilt of the top surface is removed to one fringe at the edge of the lens using the Michaelson interferometer (a run-out of .3um). Once the top surface is running true, the interferometer can look through the top surface and check the run out of the bottom surface to ensure the seat is free of burrs etc. A vertex measurement is taken, the number is entered into the lens prescription and the design is recomputed resulting in a new target lens seat height.

The lens is removed from the cell and the next seat is machined. The process is repeated until all seats have been machined. The cell is thoroughly cleaned using a HEPA vacuum cleaner and UHP nitrogen. The first lens is cleaned, inserted into the cell, tilt removed, and potted into place by eight equally spaced buttons of 3M 2216 epoxy. The lens is held in place by silver tipped setscrews. After curing the setscrews are removed and the process repeated until all the lenses are in place.

Both cells are machined in the same manner and final assembled as one lens. Typical resolution spec was 2 microns and average max distortion was 0.2 microns over a 20mm diameter field.

OSSC Fred Hansen Memorial Golf Tournament Review

Joon Park, Tom Godfrey, Ester Kleaver, & Owen Cupp

This year the Optical Society of Southern California is celebrating probably its 30th year of hosting the OSSC Golf Tournament. There are no records of the beginning of the tournament until 1998 when Fred Hansen and Bill Butek co- chaired that event. Fred served as the Golf Chair most those years because of his dedication to the Society and his love of golf, which continued throughout his life. We all wanted to recognize Fred and all who have contributed to the success of this event by naming this event in his honor.
Optical Research Associates, Harold Johnson Optical Labs, and Precision Optical have returned this year as contributors to our golf outing. We wish to thank them for their generous donations. In addition, I want to thank Hal Johnson who doesn't even play golf who generously came out to assist administering the event. I could not have done it without him, thanks Hal.
We want to thank everyone involved in the success of this year's golf outing and invite everyone to put next year's outing on May 16, 2009 on their calendar.

PTICAL SOCIETY OF SOUTHERN CALIFORNIA

Meeting Announcement Wed. June 11, 2008

Optics Education and Outreach in Southern California

Donn Silberman & Valentina Doushkina

Abstract:

For well over a decade, the Laser Electro-Optics Technology (LET) program has been teaching introductory laser and optics classes at Irvine Valley College (IVC). At the beginning of the telecom boom, the Irvine CACT was established to teach optics fabrication to support the many optics fabrication businesses in Southern California. In the past few years, these two programs have merged – with some help from the Optics Institute of Southern California (OISC) - and grown under the newly established Advanced Technology and Education Park (ATEP). IVC and ATEP are both operated by the South Orange County Community College District (SOCCCD). Last year a new program of three courses was established to teach, in sequence, lens, optical systems and optomechanical systems design. The first part of this presentation reviews the reasons for establishing these courses and their content, the students' motivations for taking them and their employers' incentives for encouraging the students.

The second part of this presentation reviews how in the modern era, art and technology have been at opposite ends of the spectrum of human study. Artists tend to be non-technical and technologists tend not to be artistic. While this is a broad generalization, it is rare to find an artist teaching science or an engineer teaching art. However, if we think back several centuries, it was very common for great artists to be at the forefront of technology. The prime example being the great Leonardo Di Vinci. Over the past several years, the optics educational outreach programs of the Optics Institute of Southern California (OISC) have incorporated using art and artists to help teach optics and related science. The original use of this was with material from the General Atomics Education Foundation, Color My World, which has been used in a number of settings. Recently, the OISC has partnered with the UC Irvine Beall Center for Art + Technology to provide Family Day Event presentations that use the themes of current Art + Technology exhibits to help attendees learn and understand more about the fundamental science through the art. The two main concepts here are that artists are using science and technology as the basis for their art, also sometimes making some social statements; and the technologists are using the art to make the science more accessible and interesting to the general pubic. This paper weaves a path from the original OISC uses of art to the recent work at UC Irvine.

About the Speakers:

Valentina Doushkina and Donn Silberman have each been in the optics field for well over twenty years and have worked together at Corning from in 2000 and 2001 and again at MetroLaser in 2005 and 2006. They are both current elected members of the OSSC Board of Directors and their OSSC biographies can be read on the OSSC website.

Special OSSC Annual Business Meeting Including OSSC Board Election Results

Meeting Details:

Date: **Wed. June 11, 2008**

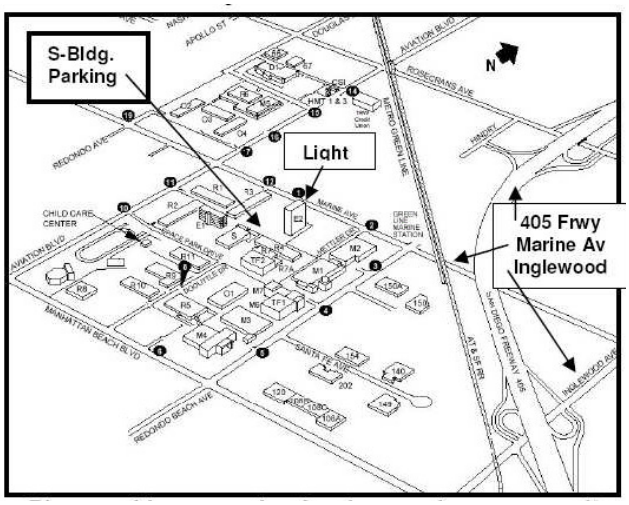
Times: 6:00 p.m. Board Meeting & Social Hour
@ Cozymel's, 2171 Rosecrans Avenue,
El Segundo, CA 902455 Phone 310-606-5505
7:00 p.m. Dinner
7:30 p.m. OSSC Annual Business Meeting
8:00 p.m. Speaker Presentations

Location: Northrop Grumman Space Technology Building "S" Cafeteria on Simon Ramo Drive; 2090 Marine Ave., Redondo Beach, CA 90278

Directions: *From the 405 FWY going North, exit right on Inglewood Ave, left on Marine Ave, and left at Simon Ramo Way (west of high-rise Bldg. E2).
*From 405 FWY going South, exit at Rosecrans West, left on Aviation, left on Marine Ave, right on Simon Ramo Way, to S. end, under S-bldg.

Cost: $25 for Dinner

RSVP: By June 6, on the OSSC Website, or Call Scott Rowe at 949-735-9927



Please post and encourage your colleagues to attend.
Friends and family of the new Fellows are also welcome.

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OSSC Corporate Profile

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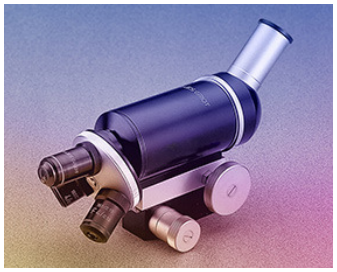

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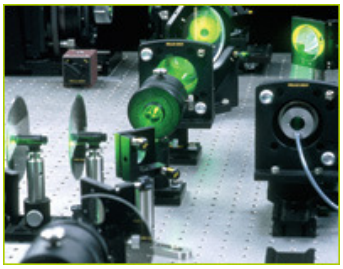

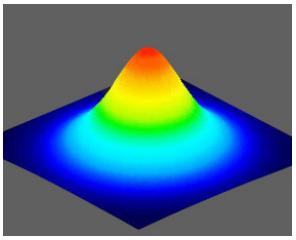

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Precision Optical specializes in the custom manufacturing of high quality optical components, optical assemblies and optical coating for the photolithography, laser, biomedical, aerospace, data storage and metrology industries. Although the majority of our business is based on customer designed elements and assemblies we also offer catalog components.

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Thank you for considering Precision Optical for your optical manufacturing needs!

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OSSC Fellow Profile

Contributed by OSSC Historian Tom Godfrey

New OSSC Fellows: In recognition of their outstanding service to the Society and to the optical industry of Southern California, five individuals were nominated by the OSSC Fellows Committee, chaired by Al Hatheway and elected by the Board of Directors to the honorary title of "Fellow". They are: Arnie Bazenski, R. Reddy Chirra, Dr Murty Mantravadi, Susan Rico & Don Wolpert. These 5 people were honored at the Wednesday, May 14 2008 meeting in Monrovia with special badges, plaques and a lifetime subscription to the newsletter and meeting notices.

Dr Murty V. Mantravadi, OSSC Fellow

Forward: Dr Murty V Mantravadi was elected by to the honorary title of OSSC Fellow, in recognition of his service to and inspiration of the officers and members of the Optical Society of Southern California. Murty is a fellow of OSA, SPIE, the Indian Academy of Sciences and the Indian Optical Society.

It is the aim and purpose of this Society to increase and disseminate the knowledge of Optics and closely allied sciences. Dr Murty's LIFE has been about optics education.

When Dr Murty came to Northrop in 1998, I was trying to integrate and normalize the diffraction pattern Bessle Functions to determine the Optical Cross-section for obscured aperture Northrop optical systems. Murty showed me an equation in Born and Wolf that reduced the problem to trivial algebra!

Dr. Murty gave a talk titled "Optricks" at the June 2003 OSSC meeting, which inspired Donn Silberman, OISC and OSSC to organize and jointly conduct an annual "Optricks Days" events at the Discovery Science Center in Santa Ana, California. Ever since those first Optricks demos, Donn has called Dr. Murty "The Wizard of Light." The biography of Dr. Murty Mantravadi and the meeting notice for his OSSC talk on "Optricks" were published in the June 2003 Newsletter, which can be found at www.ossc.org .

Submitted by: Tom Godfrey, OSSC Historian, ...Fellow and 1973-74 President

- Murty Mantravadi -

Dr. Murty V. Mantravadi was born in India in 1929 and had professional careers in India, the United States, and for a short period in Mexico. He obtained B.Sc. with majors in Mathematics, Physics and Chemistry from Andhra Christian College in Guntur, India in 1949. He then obtained a Diploma in Instrument Technology (D.M.I.T.) from Madras Institute of Technology, Madras, India in 1952. He enrolled in the Ph.D program of Institute of Optics, University of Rochester, at Rochester, New York early in 1956, earning a Ph.D. degree in Optical Engineering in 1959. From 1959 till 1964 he was on the faculty of the Institute of Optics teaching courses and doing research in Optical Testing, Interferometry, Geometrical and Physical Optics, and lab courses. At the end of 1964, he went back to India and was Professor of Instrument Technology at Madras Institute of Technology till 1966. From 1966-1982 he was head of the Optics Section of the Spectroscopy Division of Bhabha Atomic Research Center at Bombay, where he was involved in Optical Testing, setting up the optics shop, building various instruments for the Atomic Energy department, Spectroscopy and research. Dr. Murty was a visiting Professor for short periods to server institutes including some in Mexico. During his Mexican visits, he collaborated with Dr. Daniel Malacara by contributing two chapters on Optical Testing and Interferometery to the book OPTICAL SHOP TESTING, edited by Dr. Malacara. In 1982 he left India and joined the Centro de Investigacion en Optica, Leon, Mexico as a professor till 1984. He came back to United States in 1984 and worked at Halo Technologies, Costa Mesa, California as Chief Scientist till 1986 and as Professor of Physics at Alabama A&M University at Huntsville, Alabama till 1987. He then joined Northrop Corporation, Southern California in 1987 as Research Engineer and retired from Northrop Grumman at the end of 1994.

Dr. Murty has presented at various conferences and published in refereed journals such as JOSA, Applied Optics, SPIE Optical Engineering, etc. more than 120 papers relating to Optical Testing, Interferometry, diffraction, spectrometers, optical devices and gadgets, etc. He was the originator of the shear plate testing method to check for aberration and collimation of a laser beam. The method was devised almost immediately after the He-Ne laser was available in 1963 and the publication was made subsequently by him in Applied Optics. The present topic of his presentation OPTRICKS is somewhat based on his interest in optical phenomena which seem baffling at first but can be explained after some thought and the use of optical principles.

Dr. Murty Mantravadi lives with his wife Suryaprabha in Carson, California. He is available for occasional optical consulting. The Murty's have 6 children (three on the East Coast, one in Florida and two close by in Southern California.)

Dr Murty Mantravadi (310)513-1882
21610 Villa Pacifica Circle
Carson, California 90745-1737 collimate@yahoo.com or shearplate@yahoo.com

PTICAL SOCIETY
OF SOUTHERN CALIFORNIA

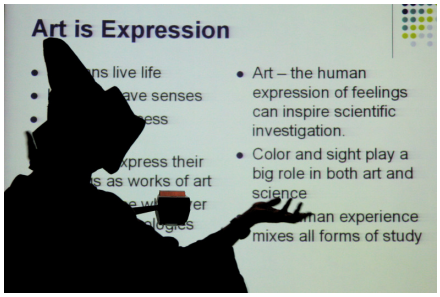
Aim and Purpose

It is the aim and purpose of this society to increase and disseminate the knowledge of Optics and closely allied sciences, to promote the mutual interests of investigators, teachers and students in these fields, and of designers, manufacturers and users of optical instruments and allied scientific apparatus as well as those who have optics as a hobby and to encourage cooperation and establish acquaintanceship among these persons.

Around the OSSC

Photos from the May 3rd Family Day Event at the UC Irvine Beall Center for Art + Technology.

The Optricks Apprentice strikes again!!



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Meetings of Related Societies

Orange County Astronomers – Monthly Meeting
June 13th. http://www.ocastronomers.org/

So Cal Science Café-
http://science.meetup.com/32/calendar/

Los Angeles Astronomical Society – General Meeting
June 9th , http://www.laas.org/Events.htm

Orange County Space - Monthly Meeting
Sunday June 15th. http://www.ocspace.org/

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Up Coming Meeting

Date	Location	Speaker	Topic
9 July 2008*	TBD*	2008-9 Board Planning Meeting	2008-9 Potential Programs, etc.

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These companies provide funding to the Optical Society of Southern California, enabling the OSSC to operate. We are grateful for their support.

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This OSSC Newsletter is sponsored by the Optics Institute of Southern California (OISC) at the Advanced Technology & Education Park of the South Orange County Community College District.
A National Science Foundation Center of Excellence for Photonics Education.

June 2008 NEWSLETTER – TIME SENSITIVE

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