



Experimentally Speaking...

<http://sem.org>

Volume 4 | Issue 3

October | 2013

MESSAGE FROM THE PRESIDENT



Emmanuel Gdoutos, SEM President, 2013-2014

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LIGHT AND SEM

The title of this year's Annual Meeting "From photoelasticity to digital image correlation and beyond" reminded me of the importance of light in experimental mechanics. Light is essential in studying states of stress and deformation in bodies. A whole category of methods in experimental mechanics, the so-called optical methods, are based on light: photoelasticity, moiré, interferometry, holography, caustics, optical fibers, digital image correlation, and combinations thereof. Further, I was reminded of the time when, as an undergraduate student in the late sixties, I started my first experiments using the optical methods of photoelasticity, moiré, interferometry and caustics. I enjoyed the marvelous colors of white light isochromatics, the wonderful images of superimposing moiré gratings, the moving fringes of interferometry, the splendid caustics around crack tips in the form of epicycloids.

Talking about light, I would like to distinguish between natural and spiritual light. We can say that with natural light the physical world is depicted in our mind through our eyes, while with the spiritual light of our belief we communicate with God. In the book of Genesis God said, "Let there be **light**, and there was **light**." God saw the **light**, and saw that it was good. God divided the **light** from the

darkness. God called the **light** "day," and the darkness He called "night."

In Christianity light characterizes God, Jesus Christ, Christians. A few excerpts in the Gospel according to Saint Matthew referring to light: "The people who sat in darkness saw a great **light**, to those who sat in the region and shadow of death, to them **light** has dawned. You are the **light** of the word. Let your **light** shine before men. And, in the Gospel according to Saint John: "In him was life, and the life was the **light** of men. The **light** shines in the darkness. For everyone who does evil hates the **light**, and doesn't come to the **light**. But he who does the truth comes to the **light**. I am the **light** of the world. He who follows me will have the **light** of life. While you have the **light**, believe in the **light**, that you may become children of **light**. I have come as a **light** into the world." The spiritual light is: strength, life, the way, the truth, harmony. Light leads man to goodness, purity, love, to scientific search.

Light, if properly used, allows us to experience the wonders of life. Helen Keller writes in her essay "Three days to see": "I became convinced that the seeing see little," and adds: "it is a great pity that in the world of light the gift of sight is used

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only as a mere convenience rather than as a means of adding fullness to life." And she concludes: "If I were the president of a university I should establish a compulsory course in 'How to Use Your Eyes'. The professor would try to show his pupils how they could add joy to their lives by really seeing what passes unnoticed before them. He would try to awake their dormant and sluggish faculties."

But, what is natural light? Answering this question was attempted since the time of Greek philosophers. Aristotle attempted to explain how the sensation of vision is caused and how light comes to earth from the sun or the stars. He assumed that the luminous bodies emit particles that enter the human eye and cause the sensation of vision. Newton assumed that the luminous bodies emit small particles or corpuscles that are propagated in space with the speed of light. He explained the phenomenon of reflection, however, for the phenomenon of refraction he concluded that the velocity of light in a dense medium is greater than the velocity of light in air. Huygens assumed that the luminous body acts as a source of disturbance in an hypothetical medium, called ether.

The disturbance propagates through the ether in the form of transverse waves. The theory explains the phenomena of reflection, refraction, interference and diffraction. Maxwell hypothesized that light waves are electromagnetic waves that propagate through space by varying electric and magnetic fields, whose directions are mutually perpendicular and perpendicular to the direction of propagation.

In experimental mechanics the nature of light is of little practical importance. We adopt the wave or electromagnetic nature of light and this is enough to deal with our problems. Polarized light is characterized by the light vector, which in the wave theory of light represents the largest displacement of the moving ether particle, while in the electromagnetic theory the electric or magnetic field vector. We have a whole area of research call Photomechanics (photo, φως and mechanics, μηχανική) that deals with the use of light in mechanics.

In all our Annual conferences the optical methods play a major role. In the 2013 Annual conference track 3 was completely devoted to optical methods.

They included: Optical metrology and displacement measurements at different scales, digital holography and experimental mechanics, optical measurement systems using polarized light, surface topology, digital image correlation, optical methods for MEMS and NEMS, three-dimensional imaging and volumetric correlation, imaging methods for thermomechanics applications, 3D volumetric flow measurement, applied photoelasticity, optical residual stress measurement techniques. With the advancement in imaging instrumentation, lighting resources, computation power and data storage, optical methods have gained wide applications across the experimental mechanics society.

I am sure that the optical methods of experimental mechanics will continue to play a major role in the investigation of states of stress in the year ahead. And I believe that the spiritual light will guide the researcher to properly use the natural light in experimental mechanics.

E. E. Gdoutos

SEM PRESIDENT RECEIVES HONORARY DEGREE

SEM President Emmanuel Gdoutos received a Doctorate Honoris Causa from the University of Nis, Serbia. The Ceremony took place on July 4, 2013 in Nis, the birthplace of Roman-Byzantine Emperor Constantine.

Emmanuel Gdoutos is Fellow of many academies in Europe, corresponding member of the Academy of Athens, Greece, most prestigious academic institution in Greece, and has received numerous awards and prizes.

PHOTO:
President of University of Nis, Professor Dragan Antic presents Emmanuel Gdoutos Diploma of Doctorate Honoris Causa of the University of Nis.



IMAC-XXXII CONFERENCE AND EXPOSITION ON STRUCTURAL DYNAMICS

THEME: DYNAMICS OF COUPLED STRUCTURES

WHERE:

Rosen Plaza Hotel
9700 International Drive
Orlando, FL 32819 USA
www.rosenplaza.com

WHEN:

Pre-conference courses:
February 1–2, 2014
Conference:
February 3–6, 2014

DETAILS

For more information and details, visit <http://www.sem.org/CONF-IMAC-TOP.asp>

WHAT

Each year we manage somehow to review 400+ abstracts. Sessions have been compiled, short courses developed and a conference organized. IMAC has become a comprehensive meeting on a broad spectrum of technologies related to structural dynamics. Technologists and researchers will find presentations, tutorials and products of interest.

One of the unique attributes of IMAC, nurtured over the years, is the mix of analytical and experimental topics, bringing the analyst and the experimentalist together as a team.

The traditional barriers have been removed to foster constructive dialog

between academics, industry and the governmental labs. It is from these meetings, that technologies are shared, enhancing our aerospace industries, infrastructure, our educational endeavors and improving society in general. As lofty as this sounds, IMAC remains a friendly meeting where exhibitors, presenters and attendees spend several days exchanging the ideas that fuel the coming year.

This is your invitation to join us in February and share the vision of Dick DeMichele who initiated this conference and set it on its course. A variety of technical programs are available including short courses,

tutorials and technical paper sessions. We have the Young Engineer program that focuses on first timers to our conference giving a solid background in experimental structural dynamics. Tutorials on sensor technology are organized each year to complement our extensive exhibitor area.

IMAC XXXII will impact your career.

Al Wicks

Welcome to IMAC 32. This year, structural dynamics aspects of civil, mechanical, industrial, aerospace, electrical, and automotive engineering all come together as we explore the Dynamics of Coupled Structures. Systems engineering is used to separate the design and analysis of complex systems into more manageable subsystems and components. The challenge for bringing the complex array of components from multiple disciplines together is the understanding the dynamic characteristics of the connections.

Structural dynamic properties at connections like bolted joints, rubber mounts and structure-fluid interfaces tend to be much more difficult to understand than the components being connected. The IMAC 32 program was designed to capture the current knowledge in modeling, measuring and interpreting subsystem interaction that results in desired and unintended aspects in the performance of complex systems.

A new addition to the IMAC program is the mobile app, Guidebook. With Guidebook, you can use your mobile device to plan your participation in pre-IMAC classes, technical presentations, exhibits, and Focus Group and Technical Division meetings. See you in Orlando!

Jim DeClerck
IMAC Advisory Board Chair

PASSING OF PROFESSOR MASAHISA PAST PRESIDENT



Dr. Masahisa Takashi, Professor Emeritus of Aoyama Gakuin University, SEM Fellow and a Past President, passed away calmly and peacefully with his family taking care of him on August 30, 2013, at the age of 74.

His wife and family members, past students, and colleagues gathered for the funeral to say a final farewell to him with deep grief and sorrow on September 2 and 3.

SEM conferences in the United States and other conferences in European and Asian countries, and introduced them to many professors. He was always followed by an entourage of students and young collaborators as his signature of commitment to the young generation and the discipline. As many as 350 students graduated from the university under his guidance during his 39 year career at Aoyama Gakuin University.

“He was always followed by an entourage of students and young collaborators as his signature of commitment to the young generation and the discipline.”

Prof. Takashi was born in Kagoshima in February 1939. He received his B.S., M.S. and Ph.D. degrees from Keio University in 1963, 1965 and 1969, respectively. He joined Aoyama Gakuin University in 1968, where he began as a Lecturer, Associate Professor for 10 years, then in 1979, he became a full professor of mechanical engineering. He taught Strength of Materials, Elasticity, Fracture Mechanics amongst other courses, to undergraduate and graduate students.

Prof. Takashi was an educator rather than a researcher. He escorted his students to not only conferences in Japan but

Prof. Takashi undertook important roles in distinguished academic societies. He served as the chair of Foreign Affairs in Materials and Mechanics Division of the Japan Society of Mechanical Engineers (JSME-MMD), and initiated the effort, with the SEM President at that time, Prof. Albert Kobayashi, to establish the cooperative agreement between SEM and JSME-MMD. At the same time, he directed the

TAKASHI, SEM FELLOW AND

“ My remembrances of Prof. Takashi are mostly from my visit to Japan in 1999, where he and his colleagues were gracious hosts. My entire family went to Japan on this occasion, and all of us enjoyed the visit. We especially recall with delight the banquet where we played the drums and generally enjoyed ourselves greatly, all under the watchful eye of the organizers and Prof. Takashi. His kindness, generous spirit and quiet, friendly demeanor will be missed by all of us who had the good fortune to spend time with him. ”

—Prof. Michael A. Sutton

experimental mechanics research group in JSME-MMD and started the ATEM (Advanced Technology in Experimental Mechanics) conference series that now takes place every 4 years in Japan. He established the Asian Committee for Experimental Mechanics (ACEM) that is now called Asian Society of Experimental Mechanics. He was also a committee member and an active participant of the MTDM (Mechanics of Time-dependent Materials) conference and the International Workshop on Advances in Experimental Mechanics. He was an SEM Executive Board member from 1996 to 1998, an SEM International Advisory Board member from 2001 to 2003, the Vice-President in 2004, the President-Elect in 2005, and the President in 2006. He was also the President of the Japanese Society for Experimental Mechanics (JSEM) from 2002 to 2003. When he was the President

of JSEM, he and the SEM President, Prof. Michael Sutton established the cooperative agreement between SEM and JSEM. He was an editorial board member of *Mechanics of Time-dependent Materials and Optics and Lasers in Engineering*. Through the aforementioned activities, he made many friends all over the world.

He received several awards including the Outstanding Paper Awards from the Japanese Society for Photoelasticity in 1991 and 2000, the Fellow Awards from JSME in 2001 and SEM in 2003, the Achievement Awards from JSEM and JSME-MMD in 2006 and 2008, as well as the R.E. Peterson Award from SEM in 2002. He was an Honorary Member of JSEM and JSME.

“ I have always thought about Masa as the best example of a real gentleman.

...and I could be confident to wear a tie in our meetings because, for sure, at least he would be wearing one too...

I knew him in the nineties and recall good meetings we had, as for example, at a party at Arkady's house in Lehigh, at many “memorable” Board Meetings at the headquarters in Bethel, having dinner with him and SEM staff (Kathy was there) at the PUB in Bethel, smoking cigarettes outside the hotels (he used to give me – because I asked - one or two of them sometimes – and I got dizzy a couple of times with them), and meeting him and his students at the SEM meetings. He brought to us many students that are today members of the Society. Great man, great scientist!”

—José Luiz Freire

His technical interest was focused on optical methods, hybrid methods, and time-dependent mechanical behavior including contact mechanics and fracture of polymeric materials. He has authored and co-authored approximately 250 research papers in the aforementioned fields.

I would like to pay my final respect to Prof. Masahisa Takashi for his endless courtesy in mentoring junior successors like us all. We shall remember that he was always engaged but friendly and caring teacher. His friendship, good will and positive spirit will inspire us for the rest of our lives.

September 4, 2013

Satoru Yoneyama—Associate Professor,
Aoyama Gakuin University

SEM CONFERENCE PROCEEDINGS POLICY

Historically SEM has always strongly encouraged presenters to prepare a paper for inclusion in the conference proceedings. IMAC has always followed the same policy. Feedback from conference attendees has indicated that they strongly prefer to have something other than an abstract to take away from the conference. This is even more important for IMAC since many of the papers presented at IMAC are not submitted to an archival journal for publication.

An additional concern about the SEM Proceedings was the fact that they are not as widely publicized as other scientific information. It is not enough to simply place material on a website and hope that search engines will find it. It is necessary to be more proactive and market the proceedings. SEM does not have the staff or money to market this material as we should.

Since 2010, SEM has partnered with Springer in an effort to give this material wider distribution. The early returns indicate that we have been successful in making this information available to a wider audience. At the same time, we have maintained our ability to make these papers freely available to conference attendees. In fact, we now generally have pdf files of the submitted papers available for download by registered conference attendees four or more weeks prior to the conference. We have been told by a number of attendees that this makes it easier for them to plan their time at the conference.

With this background, what are the major points of SEM's Conference Proceedings Policy?

- 1 All authors are strongly encouraged to prepare a 6-8-page conference paper for inclusion in the published proceedings.
- 2 Any author who submits a proceedings paper is guaranteed an oral presentation slot during the conference.
- 3 At the request of track/session organizers, an author who does not wish to submit a full paper may submit a 2 or 3-page extended abstract to meet the proceedings paper requirement. These extended abstracts will be made available to conference attendees but not supplied to Springer for inclusion in the published proceedings.
- 4 SEM recognizes that organizers may wish to invite special speakers to give keynote presentations during their track/symposium, etc. In addition, the conference itself may have plenary speakers or other special lectures (Murray Lecture, JSA Lecture). These speakers may wish to orally present their work but not supply a proceedings paper. The track/session organizer must request such an arrangement from SEM. SEM routinely approves such requests and, more importantly, the staff will then not continually remind the speaker that their paper is overdue!
- 5 All presenters have the right to ask that their work not be included in the proceedings as published by Springer. SEM then asks the author to supply a pdf paper or extended abstract that can be made available to conference attendees.

SEM CONFERENCE PROCEEDINGS FAQs

In 1943 when SEM (SESA at that time) was founded, a primary goal for the new Society was the dissemination of information. This remains a major mission of the Society. Conference proceedings are one vehicle SEM uses to fulfill this mission. In 2010, SEM signed an agreement with Springer and all subsequent conference proceedings have been published through Springer.

Why did SEM decide to publish with Springer?

SEM chose to publish with Springer as opposed to continuing to do it ourselves because we wanted to make the work visible to a wider audience. In today's world, it is no longer enough to put a PDF on a web site somewhere and expect search engines to easily find it. It requires significant work to make the material "visible." From January 2011 through October 2012, Springer reported >50,000 paper downloads from the SEM Proceedings Series. This is an indication that we are succeeding in our effort to give these proceedings papers more visibility.

What is the benefit to authors?

Authors benefit because their work is visible and available for citation. Indexing and Abstracting services are beginning to list conference proceedings and we expect major players such as ISI to begin listing conference proceedings. In addition, many of our authors do not regularly publish in journals. This publication insures that the material is available in the future.

Why does SEM ask authors to submit papers?

Both the SEM Annual Conference and IMAC have always required authors to submit proceedings papers. Though there are many different reasons that can be cited for this, the most important reason today is that conference attendees have told us that having something more than a simple abstract is important to them to get the most benefit from the conference.

I intend to publish my work in a scholarly journal. Does submission of a proceedings paper preclude such publication?

Publication of a paper in the SEM Conference Proceedings does not prevent publishing the information in another publication as part of a different article. However, you may not submit the same paper for publication in any scholarly journal.

Why do I have to submit source files as well as a PDF?

Springer uses the source files to generate the final version of the paper. In addition to formatting, etc., Springer adds the necessary metadata to insure that the information can be found by search engines. This information cannot be readily added to a PDF file.

SEM uses the PDF to make the information available to conference attendees. We generally have all papers available for download ~6 weeks before the conference. As people register they are given information on how to download the papers. Attendees have told us that having the paper available before the conference allows them to better plan their time at the conference.

Will I have an opportunity to review my paper before publication?

Prior to publication, you will receive via email a proof of the final paper for review. In fact, earlier in the process, you will receive an email from the production editor giving you an approximate schedule on when you can expect proofs for review.

Are SEM Proceedings peer reviewed?

Abstracts submitted for the conference are peer reviewed. Final papers submitted are not peer reviewed.

How can I find my paper online?

The easiest way is simply to search for the paper title. Any other search is likely to give too many results to readily locate the paper.



FREQUENTLY ASKED QUESTIONS



Experimentally Speaking...

IMAC-XXXII COURSES OFFERED:

SATURDAY, FEBRUARY 1, 2014 | 8:00 A.M.—6:00 P.M.

COURSE	INSTRUCTORS
Course 101: Operational Modal Analysis: Background, Theory & Practice	Prof. Svend Gade—Brüel & Kjær University Prof. Carlos E. Ventura—The University of British Columbia
Course 102: Experimental Dynamic Substructuring	Randy Mayes—Sandia National Laboratories Matt Allen—University of Wisconsin-Madison Daniel Rixen—Tech. U. Munich
Course 103: Signal Processing for Machine Condition Monitoring and Fault Diagnosis	Dr. Suri Ganeriwala— SpectraQuest, Inc. Richmond, VA Assisted by Anders Brandt—University of Southern Denmark

SUNDAY, FEBRUARY 2, 2014 | 8:00 A.M.—6:00 P.M.

COURSE	INSTRUCTORS
Course 104: Teaching, Learning and Performing Vibration Analysis <small>Using the Free ABRAVIBE MATLAB®/Octave Toolbox</small>	Anders Brandt—University of Southern Denmark
Course 105: Nonlinear System Identification in Structural Dynamics	Gaëtan Kerschen— University of Liège Keith Worden— University of Sheffield
Course 106: Handling of Accelerometers	Marine Dumont—Product Manager Acceleration Kistler Instrument Corp Thomas Petzsche—Application Specialist Acceleration Kistler Instrument Germany

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