March Chapter Meeting
Understanding Laser Material Processing: The Dichotomy of Laser Damage and Laser Machining
Speaker: Dr. Manyalibo J. Matthews
Lawrence Livermore National Laboratory

Meeting Location
Michael's at Shoreline 2960 Shoreline Blvd., Mountain View

Wednesday, March 12, 2014
5:30 pm Social/Networking 6:15 pm Dinner 7:30 pm Speaker
Buffet Dinner Cost: ASM Members $25 Students $10 Guests $30
Reservations: Contact Al Kwong at (408) 248-1916 or al_kwong_41@yahoo.com by 1:30 pm, 3/10/14

It is recommended to pay in advance at the ASMI website to help speed the sign-in process.

ASMI-SCV Monthly Meeting Sign-up
Members and students need to log in to receive the discount

Abstract
In the decades since the invention of the laser, new applications and discoveries in materials science have continued year after year as laser sources evolve and more areas of research exploit them. The transformation of materials using focused, high irradiance laser beams fundamentally involves multiple physical phenomena such as optical absorption, heat transport, structural mechanics and material phase transitions. For example, nonlinear absorption of nanosecond pulsed laser light can lead to a nano-scale thermal runaway effects and subsequent damage, which can be detrimental in the operation of high power laser systems. On the other hand, laser processing of materials often involves ablative removal of material or transformations which rely on efficient coupling of laser energy into a work piece. In both cases, understanding laser-material interactions is essential for the optimization of the high power optical system design.

In this talk we will present a few examples of high photon flux laser material processing, using both experiment and finite element modeling to understand energy deposition, heat transport and material transformation. Specifically, we will explore the conditions which bring about optical damage in ultraviolet Q-switched laser optics, and compare these conditions to those used in microsecond-pulsed, resonant IR laser heating for laser polishing and machining. We will discuss how our results can be used to elucidate material behavior, optimize processing and develop new technologies based on laser modified materials.

Biosketch
Manyalibo J. Matthews received a B.S. in Applied Physics from the University of California Davis in 1993 and a Ph.D. in Physics from the Massachusetts Institute of Technology in 1998. He was a post-doc at Bell Laboratories in Murray Hill, NJ from 1998 to 2000, and then Member of Technical Staff from 2000-2006 where he worked on materials characterization of optical devices using novel spectroscopic techniques, stress-induced birefringence in planar optical devices and research in advanced broadband access networks. Since 2006, Dr. Matthews has been a Member of Technical Staff in the Condensed Matter and Materials Division at Lawrence Livermore National Laboratory, leading a research group which studies various laser applications. His interests include laser-matter interactions, optical damage science, optical spectroscopy and laser-based chemical vapor deposition.
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Chairman’s Address
February was National Engineering for the US and March is National Engineering Month for Canada. Canada has this to say “Engineering is more exciting than many think. It is truly all around us. When you drive across a bridge, fly a plane, use a computer or make a cell phone call, you experience the brilliant work of engineers. The results of their work can also be seen in satellites orbiting the Earth, on offshore oil rigs and in tall buildings rising from the world’s metropolitan cities. Engineers shape our future with forward thinking designs, new technologies and breakthrough developments that haven’t been thought up yet. They prove, each and every day, that anything’s possible...”.

The Santa Clara Valley Chapter engages in many activities to raise awareness of engineering generally and Materials Engineering in particular. Next week we will be traveling to the San Jose convention center to judge science fair projects and award prizes as part of encouraging area youth to look with interest at engineering. Volunteers are welcome and encouraged.

Thanks,
Paul Flowers, Nor-Cal SAMPE Chair
Joshi Anne, ASMI-SCV Chair

Please note the upcoming events of our Chapter

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<th>Date</th>
<th>Speaker</th>
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<td>3/12/14</td>
<td>Synopsis Silicon Valley Science Fair</td>
<td>Judging in the Specialty category</td>
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<tr>
<td>4/9/14</td>
<td>Dr. Slade Gardner, Lockheed Martin</td>
<td>Affordable Thermoplastic Nano Composites</td>
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Other Events of possible interest to the ASMI-SCV audience:

**Silicon Valley Science Fair**  **March 12**

Synopsys Silicon Valley Science and Technology Championship

San Jose Convention Center: South Hall building (187 Balbach St, San Jose, CA 95110).

**ASM** and **SAMPE** will be teaming up to judge science fair entries in the Specialty category. Volunteers are eagerly welcomed for help with this event. Contact Al Kwong at (408) 248-1916 or al_kwong_41@yahoo.com for more information.

**Contact Us!**

Any comments, corrections, additions or suggestions will reach us through our email: asm.scv.secretary@gmail.com. We will be happy to hear from you.

**Chapter Sustaining Members**

We would like to thank the following corporations who support our chapter through sustaining memberships:

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