



# FLASHPOINTS

Newsletter, Vol. 1.0 Apr. 2005



## 2005 Board Meeting Takes Place in Charlottesville, VA.

Attendees include, Directors Dr. Mool C. Gupta, UVA and Dr. Jyoti Mazumder, UM, as well as, Dr. Radovan Kovacevic, SMU, Mr. Gregg Sucha and Mr. Larry Shah, IMRA, Dr. Yamamoto, Toyota, and others. This is the second board meeting of the IUCRC and marks Toyota's entry to the Board as a full member. WELCOME!

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**The University of Virginia** is distinctive among institutions of higher education. Founded by Thomas Jefferson in 1819, the University sustains the ideal of developing, through education, leaders who are well-prepared to help shape the future of the nation. The University is public, while nourished by the strong support of its alumni. It is also selective; the students who come here have been chosen because they show the exceptional promise Jefferson envisioned. [Source, UVA website.]

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## DIRECTOR'S MESSAGE

The months since our first Board Meeting have been filled with activity and excitement. The University of Michigan Center for Lasers and Plasmas for Advanced Manufacturing (CLPAM) is up and running with a variety of ground breaking projects in progress. For the benefit of our members, a brief introduction to these projects and other vital information about the Center at the University of Michigan can be found on the CLPAM website at <http://www.engin.umich.edu/research/lamircuc/index.html>. Another benefit of membership is this newsletter. We encourage our partners to make full use of these resources by providing short articles, links, and graphics for inclusion in both newsletter and website. Contact Information can be found on the front page of this newsletter. Other events of note include the move of Dr. Mool Gupta and the Virginia Center from ODU to UVA and Toyota Motor Manufacturing North America Inc. joins our Board of Directors as a full member.



CLPAM Director  
Dr. Jyoti Mazumder  
Robert H. Lurie  
Professor of  
Engineering

**Scientist Profile** in each issue we will profile either a partner or contributing scientist

### ZERO-GAP GALVANIZED STEEL WELDING



**Ashish Dasgupta**

- Ph.D. student
- M.S., University of Michigan
- B.E., Visvesvaraya Regional College of Engin., India
- Project(s): Remote laser welding of galvanized and galvaneal steel

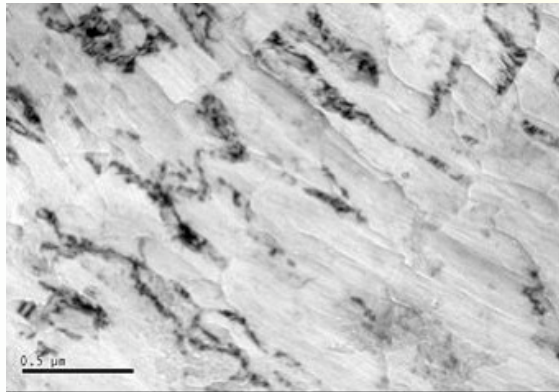
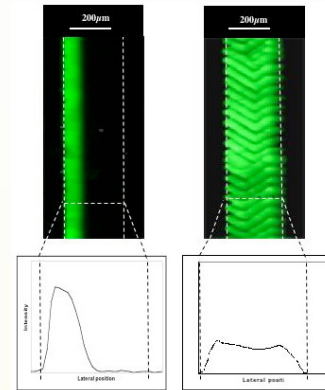
Laser welding of zinc-coated steel has always been a challenge due to the low boiling point (907 deg. C) of zinc, which evaporates violently at the weld interface, resulting in undesirable high porosity joints. This problem is more prominent in lap welds. While there are number of methods reported in the literature for such type of welding, as of today there is no production friendly solution available. So a strong need for a better laser welding process and its monitoring mechanism still exists.



### One Step Fabrication by Laser Micromachining for Microfluidics Vascular Network

A look toward an all in one laser machining process:

- Current technique uses Nd:YAG laser operating at fundamental wavelength of 1064 nm. Resolution is not fine (rough!!!)
- Incorporate Nd:YAG for rough machining (bulk machining) with a femto-second laser for fine machining (finishing work). All in one laser machining process.



### NANO-CRYSTALLINE SURFACES FOR IMPROVED COMBUSTION

To manufacture nano-crystalline surfaces (of various metals) by high brightness diode-pumped Nd-YAG lasers by rapid melt and quench technique and experimentally quantify the catalytic behavior of these metallic nano-crystalline surfaces in a configuration that facilitates measurements and modeling of this behavior.

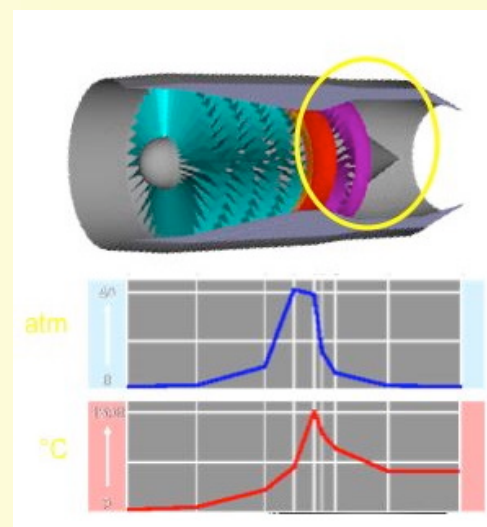
Experimentally quantify the microstructure of these materials to understand the catalytic effect on the gas phase using detailed chemistry models.

Benefits: Identification & quantification of metallic surfaces for various applications and a basic understanding of the phenomenon that can be extended to other application

### SINGLE CRYSTAL SUPER ALLOY COATING

Project investigations may include: Survey of the deposit's macroscopic/ mechanical properties

- Examination of crack healing capabilities
- Examination of film quality and growth behavior for the deposition of thick films
- Considerations on industrial applicability
- Scale-up and increase of deposition rate
- Facilitation for commercial use (reduction of deposition temperatures)
- Improvements in process stability (temperature gradients) considerations on the use for MEMS



## A LOOK AHEAD

With the full participation of our current full and associate members and the addition of new members, we anticipate great things for the Center for Lasers and Plasmas For Advanced manufacturing (CLPAM) and its partners. Please fill in the short form below or get in touch with the CLPAM secretary, Mrs. Susan C. Chamley, to be certain that contact information for your organization is up to date. We wouldn't want you to miss out due to something as simple as an incorrect address. Thank you.

Member Representative \_\_\_\_\_

Member Organization \_\_\_\_\_

Street Address Line 1 \_\_\_\_\_

Street Address Line 2 \_\_\_\_\_

City, State Zip Code \_\_\_\_\_

## ON THE CALENDAR

April 7-8, 2005	Spring Board Meeting
May 7-8, 2005	Presentation copies mailed to Full members
May 15, 2005	Deadline for submissions to Flashpoints
June 1, 2005	Premier issue of Flashpoints is mailed
September, 2005	Preliminary agenda for Fall Board Meeting sent via e-mail
October, 2005	Fall Board Meeting

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*Center for Lasers and Plasmas  
for Advanced Manufacturing*

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New s l e t t e r

