



Newsletter of the Atlanta Chapter of ASM International  
<http://www.asm-atlanta.org/> Normally Meets 3rd Tuesday  
January, 2006 Volume 12 Number 5

## **Joint AIAA/ASM January Dinner Meeting**

**Tuesday Evening, Jan. 17, 2006**  
**In the Georgia Tech School of Materials Science & Engineering**  
**Located in the Love Building - 3rd Floor Atrium**

### **"Maintaining Aircraft Structural Integrity In A Perfect Storm"**

**presented by**

**Col Robert S. Fredell, Ph.D.**

Deputy Director, Engineering  
Warner Robins Air Logistics Center

also

### **"Visualization of 3D Microstructures Reconstructed from Serial Sections in Ti-B Alloys"**

presented by

**Scott I. Lieberman**

A 10-minute Ph.D. student presentation  
School of Materials Science & Engineering,  
Georgia Institute of Technology

## Tuesday Evening, January 17, 2006

**Wine Reception & Social:** 6:00 PM  
**Dinner:** 6:30 PM  
**Introductions & Business:** 7:20 PM  
**Mr. Lieberman's Presentation:** 7:35 PM  
**Dr. Fredell's Presentation:** 7:50 PM  
**Meeting adjourns by** 9:00 PM

**Dinner Costs:**

\$20.00 for Professionals, \$6.00 for Students

**WHERE** -- The GA Tech School of Materials Science & Engineering, in the J. Erskine Love Manufacturing Building.

**Map:** <http://www.asm-atlanta.org/>

**Menu:** **Chicken breast** stuffed with a rice & shrimp stuffing served with Yukon Gold Potato Puree and Creole Sauce, classic Caesar salad, freshest seasonal vegetables, dinner rolls with creamy butter, iced tea, ice water, coffee, dessert bites. Veggie dinner – upon request.

**Reservations:** RSVP - by Monday, January 16 to **Marlene White**,  
Tel: (404) 894-2850, Fax: (404) 894-9140, marlene.white@mse.gatech.edu

**Note:** If it is desired or necessary for you to eat elsewhere, please know that you are very welcome for the program - at no charge. Come & meet with your technical friends and make new ones.

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**ABSTRACT: Maintaining Aircraft Structural Integrity In A Perfect Storm**

Col **Robert S. Fredell**, Ph.D., Deputy Director, Engineering, Warner Robins Air Logistics Center

The U.S. Air Force faces a convergence of adverse conditions and events affecting the structural integrity of our aging fleet of aircraft. A continued austere funding environment for sustainment in the face of an increased operational tempo for the Global War on Terror continues to result in an aircraft fleet that ages at a much higher rate than replacement with new systems. This environment, combined with incomplete usage and maintenance data collection, decreasing confidence levels in safety-critical non-destructive inspection results, and a hodge-podge of isolated structural health monitoring technology advancements without systems integration, provides a greater challenge today to our Aircraft Structural Integrity Program (ASIP) than in the period following Aloha Airlines' notorious in-flight failure of a Boeing 737 fuselage in 1988.

The U.S. Air Force has numerous requirements for maintenance data documentation, but collection of data of the type and format needed to support ASIP has been limited. Tail-number-specific maintenance data collection data, continuously maintained for the life of each aircraft, are spotty at best. The just-updated ASIP military standard 1530C requires that complete structural maintenance data be recorded in a maintenance data collection database, including detailed inspection, corrosion and repair data in a way that structural configuration management is maintained and structural inspections can be scheduled properly.

This presentation will present a proposed ASIP "road ahead" for the Air Force, Department of Defense, and our teammates in private industry and the universities. We must instill greater engineering discipline in a better-educated and trained technical workforce supporting the ASIP program. More

robust investment strategies must be applied to technologies for sustaining aging aircraft, so that when the great-grandchildren of the first pilots of the B-52 are flying the same aircraft, they can do so safely and with confidence.

**Colonel Robert S. Fredell** is Deputy Director of Engineering at Warner Robins Air Logistics Center, Robins AFB GA, overseeing an organization of more than 1,300 civilian and military engineers and scientists. As the deputy to the senior engineering manager for the Air Logistics Center, he provides military leadership and technical direction and guides the force development of the engineers and scientists supporting weapon systems including F-15, C-5, C-17, C-130, Global Hawk, U-2, Special Operations Forces aircraft, missiles, ground support equipment, ground vehicles, electronic warfare, airborne avionics, and others.

Prior to this assignment, he was the Director of Research at the United States Air Force Academy, CO, after serving as Technical Director for the European Office of Aerospace Research and Development, a detachment of the Air Force Office of Scientific Research, in London, UK, where he represented the Munitions and Materials & Manufacturing Directorates of the Air Force Research Laboratory.

Colonel Fredell was commissioned as a distinguished graduate through the ROTC program and entered active duty with the Air Force in 1983 as a graduate student in mechanical engineering at Oklahoma State University. Following completion of his Master's Degree, he was assigned to the Wright-Patterson Air Force Base, OH, where he advanced through various engineering assignments in the Air Force Acquisition Logistics Center, Air Force Flight Dynamics Laboratory, and Air Force Materials Laboratory, contributing to the development of various systems including the C-17 and F-22. He has taught Engineering Mechanics at the United States Air Force Academy, and earned a Ph.D. in Aerospace Engineering from Delft University, the Netherlands.

Col Fredell is married to the former **Trista Niemann**. The Fredells have a daughter and a son.

#### **EDUCATION**

1982 - Bachelor of Science, Mechanical Engineering, Oklahoma State University  
1983 - Master of Science, Mechanical Engineering, Oklahoma State University  
1987 - Squadron Officers School, Maxwell AFB, AL  
1994 - Ph.D., Aerospace Engineering, Delft University, the Netherlands  
1996 - Air Command and Staff College, correspondence  
2003 - Air War College, correspondence

#### **CAREER CHRONOLOGY**

1. January 1983 – December 1983, graduate student, Mechanical Engineering, Oklahoma State University
2. January 1984 – May 1985, staff corrosion engineer, Air Force Acquisition Logistics Center, Wright-Patterson AFB OH
3. May 1985 – December 1986, advanced metallic structures program manager, Flight Dynamics Laboratory, Wright-Patterson AFB OH
4. January 1987 – March 1987, student, Squadron Officers School, Maxwell AFB AL
5. March 1987 – June 1988, chief supportability engineer, AF Materials Laboratory, Wright-Patterson AFB OH
6. July 1988 – Dec. 1990, instructor, later assistant professor, Department of Engineering Mechanics, USAF Academy CO
7. January 1991 – November 1993, doctoral student, Aerospace Engineering, Delft University, the Netherlands
8. December 1993 – June 1998, associate professor, deputy for operations, and director, Center for Aircraft Structural Life Extension, Department of Engineering Mechanics, USAF Academy CO
9. July 1998 – June 2001, technical director, European Office of Aerospace Research and Development (Detachment 1, AF Office of Scientific Research), London, UK
10. July 2001 – June 2004, director, faculty research, USAF Academy CO
11. June 2004 – present, deputy director of engineering, Warner Robins ALC GA

#### **MAJOR AWARDS AND DECORATIONS**

Air Force Science and Engineering Award (Research Management)

Meritorious Service Medal with three oak leaf clusters  
Air Force Commendation Medal  
Overseas Tour (long) with one oak leaf cluster  
Distinguished Graduate, Air Force ROTC  
**EFFECTIVE DATES OF PROMOTION**  
Second Lieutenant December 18, 1982  
First Lieutenant December 1, 1984  
Captain December 1, 1986  
Major November 1, 1994  
Lieutenant Colonel June 1, 1999  
Colonel April 1, 2005  
(Current as of July 2005)

**Abstract for Student Presentation: "Visualization of 3D Microstructures Reconstructed from Serial Sections in Ti-B Alloys", by Scott I. Lieberman**

In the development of boron-modified titanium alloys, characterization and visualization of the three-dimensional (3D) microstructure containing in-situ formed titanium boride whiskers is of significant theoretical & practical interest. The properties and performance of the resultant material depend on the attributes of the 3D microstructural geometry. A recently developed montage-based serial sectioning technique has been utilized to visualize and recreate large volumes of 3D microstructure on a millimeter length scale at sub-micron resolution in Ti-B alloys processed by pre-alloyed (PA) powder metallurgy. Compositions near the eutectic point of the Ti-6Al-4V-B system (1.7 wt. % B) and in the hypoeutectic region (1 wt. % B) have been investigated using this serial sectioning technique. Montage-based serial sectioning is useful for detecting and characterizing both short-range and long-range spatial patterns in non-uniform microstructures, and is of relevance for the increasingly diverse potential applications of Ti-B alloys.

## **2006 ASM Materials Camps**

### **Don't Let This Extraordinary Opportunity Pass for Some Atlanta Area Young Person!!!**

Materials Camp is an outstanding opportunity for high school students to experience quality exposure to advanced instrumentation and methods of materials analysis. And it is essentially **FREE** to the student. We have been able to place a student from the Atlanta area in these camps each year - **except for last year - when no one even applied from our area!!** We were asked by camp personnel "what happened" while at metals Park during the camp in August. Let's not have this opportunity pass us again this year. **One resident camp will be in Cleveland, OH, August 7-13 and another July 23-28 in the dorms at the University of Missouri-Rolla.** For information, please contact the Atlanta Chapter's Education & Academic Advisor, Professor **Naresh Thadhani** at [naresh.thadhani@mse.gatech.edu](mailto:naresh.thadhani@mse.gatech.edu) or 404-894-2651. Get in touch with Dr. Thadhani as soon as possible to learn what is required for the application and begin to process paper work before the year ends so that at least one bright young person from the Atlanta area, or Georgia, can take advantage of this truly outstanding opportunity.

This weeklong academic camp features highly interactive, lab-based activity tailored to individual student interest areas. Evening social activities include a materials "sub-theme" (i.e.; tours of local attractions and industry tours, etc.). Students "graduate" during a special event with chapter, ASM, and Foundation leaders, where they have the opportunity to meet and network, and explore career options.

Materials Camp begins with a welcome reception and dinner, where students, faculty and staff get acquainted. Second day opened with an introduction to materials of today and tomorrow, along with a

basic overview of materials failures and why/how they occur. The students are then organized into small groups and teamed with a Volunteer Faculty "Materials Mentor" who works with them throughout the week. A variety of experiments and lab activities such as metallography, mechanical testing, light microscopy, fractography, scanning electron microscopy, image analysis, and chemical analysis are used.

The camp concludes with the teams presenting a summary of their findings, including recommended corrective action to members of the ASM Foundation Board, ASM International Board, the entire Materials Mentor Faculty, and their student peers. The program ends with graduation and a dinner.

### **Target Audience**

Students entering their **junior** or **senior** year in high school.  
Highly motivated inquisitive learners with math and science aptitude.

### **Cost**

Students receive free housing, meals, tuition, entertainment and knowledge.

**Application deadline** at ASM HQ is January 31.

**Required information** includes school transcript, a maximum of two letters of recommendation  
Personal essay (100 words or more)

### **Selection Of Finalists**

This is a competitive application process. Students must have basic knowledge of algebra, chemistry, and physics and describe why they want to learn more about engineering and materials science as a possible college major and career.

Experienced practicing engineers review each application to select the "best and brightest," highly motivated students who have not yet made a firm decision about a college major or career.

Students must have a strong interest in applied science. Prior participation in science fairs is helpful, but not required.

## **Future Meetings**

Feb 21	<b>Dr. Bhakta Rath</b> , ASM Fellow & Immediate Past President of ASM – <b>Energy Issues</b>
March 21	<b>Student Poster Session</b> (graduate and under graduate MSE students)
April 18	<b>Dr. Frederick Schmidt</b> , ASM Trustee. <b>Blacksmithing of Modern Firearms &amp; Ammunations</b>

## **Officers for the 2005-2006 Chapter Year**

The ASM Atlanta Chapter officers for the 2005-06 year:

<b>Chairman:</b>	<b>Hamid Garmestani</b>	hamid.garmestani@mse.gatech.edu
<b>1st Vice President</b> (Programs):	<b>Gautam Patel</b>	gautam.patel@gtri.gatech.edu
<b>2nd Vice President</b> (Industrial Relations):	<b>Harry Tian</b>	htian@giwindustries.com
<b>Treasurer:</b>	<b>David Morrison</b>	davidmorrison@stcmets.com
<b>Secretary:</b>	<b>John Barnes</b>	john.e.barnes@lmco.com

The Chapter 's Executive Committee consists of the above five Chapter Officers plus the following Standing Committee Chairs

<b>Membership:</b>	<b>Eric Weishaupt</b>	eweishaupt@mmelab.com
<b>Education &amp; Academic Advisor:</b>	<b>Naresh Thadhani</b>	naresh.thadhani@mse.gatech.edu
<b>Yearbook/Directory:</b>	<b>John Mihelich</b>	jlmihelich@comcast.net
<b>Finance:</b>	<b>George Kremer, Past Chair</b>	gwkremer@bellsouth.net
<b>Newsletter Editor:</b>	<b>Bill Livesay</b>	livesay3@bellsouth.net
<b>Web Site Coordinator:</b>	<b>Jud Ready</b>	jud.ready@gtri.gatech.edu
<b>Short Course Director:</b>	<b>Preet Singh</b>	preet.singh@mse.gatech.edu
<b>Ga Tech Student Chapter Chair:</b>	<b>Simon Dunham</b>	gtg949d@mail.gatech.edu
<b>Council of Past Chairs:</b>	<b>Steve Johnson</b>	steve.johnson@mse.gatech.edu
	<b>Kim Spinsby</b>	kim.spinsby@siemens.com
	<b>Jim Hubbard</b>	jhubbard@magianalysis.com

The chapter leadership is always looking for chapter members who are interested in actively supporting the work of your chapter. This is a particularly good time of the chapter year to contact one of the recently elected officers and offering your services as a member of one of the standing committees listed above. Please, please step up and contact one of these individuals!! You will find working with a technical society, and particularly this one, to be a rewarding experience.

### **Features of ASM-Atlanta** **The Newsletter of the Atlanta Chapter of ASM International**

- Program Notes for Meetings
- Chairperson's note to members.
- Career Development: job opportunities or jobs needed
- Company Feature:
- Technical Features:
- Education Feature: Materials course offerings.
- Georgia Tech Student Chapter News
- Member News
  - Special Events, Awards & Honors.
  - New Members
  - Deaths
  - Transitions
- ASM International News
- Advertisements
- Outreach (ASM members to Schools, Scouts, etc.)

**Send information, articles or suggestions to:**

**Bill Livesay**, Editor *ASM-Atlanta*.

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