

Newsletter of the Atlanta Chapter of ASM International  
<http://www.asm-atlanta.org/> Normally Meets 3rd Tuesday  
September, 2005                      Volume 12                      Number 1

## **September Meeting of the Atlanta Chapter of ASM**

**Tuesday Evening, Sept. 20, 2005**  
**In the Georgia Tech School of Materials Science & Engineering**  
**Located in the Love Building - 3rd Floor Atrium**

### **"HIGH TEMPERATURE HELIUM-COOLED FAST REACTOR (HTHFR)"**

**presented by**

**R. A. Karam**

**Executive Director;**  
**Education, Research & Development Association of Georgia Universities**  
**& Professor Emeritus; Georgia Institute of Technology**

also

### **"Phenomena of Formation of Gas Induced Shrinkage Porosity in Pressure Die-Cast Mg-Alloys"**

presented by

**Soon Gi Lee**

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

## Tuesday Evening, September 20, 2005

**Wine Reception & Social:** 6:00 PM  
**Dinner:** 6:30 PM  
**Introductions & Business:** 7:15 PM  
**Student's Presentation:** 7:30 PM  
**Dr. Karam's Presentation:** 7:45 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: Southern Sizzle;** Greens with Black Olives, Black Beans, corn, chopped tomatoes and tortilla strips, southwestern ranch dressing, tortilla chips with black bean dip, chicken with sauteed peppers and onions, fajita shells, mexican corn, fajita toppings: sour cream, guacamole, salsa, shredded cheddar cheese chopped tomatoes, cinnamon tortilla crispers, iced tea and water, regular coffee, mini chocolate brownies.

**Reservations:** RSVP - by Monday, September 19 to **Marlene White**,  
Tel: (404) 894-2850, Fax: (404) 294-9140, marlene.white@mse.gatech.edu

**Note:** If it is necessary for you to eat elsewhere, please know that you are very welcome for the program. Come & meet with your technical friends and make new ones.

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**ABSTRACT**

**HIGH TEMPERATURE HELIUM-COOLED FAST REACTOR (HTHFR)**

R. A. Karam, Dwayne Blaylock, Eric Burgett, S. Mostafa Ghiaasiaan, and Nolan Hertel  
Georgia Institute of Technology  
Atlanta, GA 30332-0425 USA  
ratib.karam@nnrc.gatech.edu

Scoping calculations have been performed for a very high temperature (1000oC) helium-cooled fast reactor involving two distinct options: (1) using graphite foam into which UC (12% enrichment) is embedded into a matrix comprising UC and graphite foam molded into hexagonal building blocks, shown in Figure 1, and encapsulated with a SiC shell covering all surfaces, and (2) using UC only (also 12% enrichment) molded into the same shape and size as the foam-UC matrix in option 1. Both options use the same basic hexagonal fuel matrix blocks to form the core and reflector. The reflector contains natural uranium only. Both options use 50 m SiC as a containment shell for fission product retention within each hexagonal block.

The calculations show that the option using foam (option 1) would produce a reactor that can operate continuously for at least 25 years without ever adding or removing any fuel from the reactor. The calculations show further that the UC only option (option 2) can operate continually for 50 years without ever adding or removing fuel from the reactor. Doppler and loss of coolant reactivity coefficients were calculated. The Doppler coefficient is negative and much larger than the loss of coolant coefficient which

was very small and positive. Additional progress on and development of the two concepts are continuing.

**About the Speaker: Dr. Ratib A. Karam**, a professor emeritus for nuclear Engineering and Health Physics, was responsible for the operations of the Georgia Tech nuclear research reactor at Georgia Tech. As director of the Nuclear Research Center he was responsible for the conversion of the Georgia Tech Research reactor from high to low enrichment fuel and for renewing its operating license for another twenty years. His research interests include: new reactor concepts, nuclear reactor safety, emergency planning, environmental health, and radiation transport. He continues to teach graduate courses in reactor physics.

He is responsible for the operations of ERDA. He serves as ERDA's executive director. Dr. Karam has been instrumental in working with WSRC and the U.S. Department of Energy to clearly define the role of the Savannah River site and to articulate the research needs for safe and efficient operations and clean-up. He has led ERDA in the development of multi-million dollar research efforts. He is committed to a regional partnership between Georgia, South Carolina and surrounding states.

**About the Student Speaker:**

**Soon Gi Lee** is a Materials & Sciences Ph.D. student at Georgia Tech.

**Abstract: "Phenomena of Formation of Gas Induced Shrinkage Porosity in Pressure Die-Cast Mg-Alloys"**. It has been known that the formation of gas and shrinkage porosity has different dependencies on the process conditions, and consequently, the gas and shrinkage pores are usually regarded as independent microstructural attributes. In this contribution, it is shown that in high-pressure die-castings gas pores can lead to the formation of shrinkage porosity under specific conditions. This is because the air/gas in the gas porosity is an efficient heat-insulating medium. Therefore, the presence of gas porosity can retard the heat transfer in the liquid melt as compared to similar regions without gas porosity. Consequently, the local solidification rate is lower in such region, leading to shrinkage porosity formation. The two and three-dimensional (3D) microstructural observations using digital image analysis and numerical simulation for heat transfer support such a hypothesis. Further, the finite element (FE)-based simulations have been performed on the 3D microstructures to reveal the variations of local stress caused by gas induced shrinkage porosity.

**Atlanta Chapter of ASM International  
Again Officially Recognized as a "Five Star Chapter"**

First Vice-Chair, **Gautam Patel**, represented the Atlanta Chapter at ASM's Leadership Days August 11-14, in Cleveland, Ohio. The photograph immediately below on the left shows Gautam participating in one of the many sessions that made up Leadership Days. Below on the right shows Gautam displaying the Five-Star Award that Gautam had just received for our chapter with Dr. **Bhakta B. Rath**, President of ASM International. Incidentally, Gautam arranged with Dr. Rath to visit Atlanta to make a technical presentation concerning alternative energy issues early in 2006.



Gautam Patel in white shirt to center-right.



Gautam Patel & ASM President, Dr. Rath, displaying Atlanta Chapter's 5-Star Award.

Gautam established valuable friendships while sharing ideas with a number of leaders from other Chapters around both the US and other countries. On Saturday evening, the entire group traveled to ASM head quarters where the chapter leaders at Leadership Days were treated to a dinner followed by presentations from the student research groups participating in Materials Camp. The dinner was served under a large tent, which was critically needed due to a strong rainstorm. Below and to the left are **Bill Livesay** and Gautam, posing outside the dome & tent. Bill was at Leadership Days as a member of Chapter Council, which is responsible for the event each year.



Bill Livesay & Gautam Patel standing outside ASM's famous Dome.



Beautiful fountain under center of dome.

**From immediate past Chairman of the ASM Atlanta chapter, George Kremer :**  
**"A sense of community within ASM Atlanta"**

**October Program:**

**Mike Harris**, Georgia Tech Research Institute, Electro-Optical Systems Laboratory  
**"Materials Considerations for Packaging Wide Bandgap Semiconductor Devices"**

## 2005-2006 Yearbook

**Dr. John Mihelich** has developed the 2005-2006 Chapter Yearbook. The official ASM Members of the Atlanta Chapter should have received an electronic copy of this document in June. If a chapter member was somehow missed and wishes to receive a free-of-charge copy, please send your email address to John. Hard copies are also available for \$10 each.

If a company or an individual wishes to advertise, space will be available. A business card size ad is going for \$25 and a **half page** for \$50. Copy must be email publication ready to be accepted. Time is short so please send your ad to <mailto:jlmihelich@comcast.net>jlmihelich@comcast.net as soon as possible.

### 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 (Programs):</b>	<b>Gautam Patel</b>	gautam.patel@gtri.gatech.edu
<b>2nd Vice President (Industrial Relations):</b>	<b>Harry Tian</b>	htian@giwindustries.com
<b>Treasurer:</b>	<b>David Morrison</b>	davidmorrison@stcmetals.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>James Lane</b>	JLANE@mactec.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*.

775 Upper Hembree Road

Roswell, GA 30076

Livesay3@bellsouth.net, or b.livesay@gtri.gatech.edu

770-664-8742