



ASM - Atlanta

Newsletter of the Atlanta Chapter of ASM International

<http://www.asm-atlanta.org/> Meets 3rd Tuesday

February, 2002

Volume 8

Number 4

February Meeting of the Atlanta Chapter of ASM

Tuesday Evening, February 19, 2002

At the Georgia Tech First Place Cafeteria,

PROGRAM

Probability of Failure Analysis for Fracture Critical F-22 Titanium Castings

presented by

T. R. Brussat, P. J. Caruso, and D. A. Ulman

F-22 Structures, Lockheed-Martin Aeronautics Company,
Marietta GA 30068-0987

also

Effect of Shock-Activation on Post-Shock Reaction Synthesis of Ti-Based Ternary Carbides, Ti_3SiC_2 and Ti_2AlN

A 10-minute Ph.D. student presentation by Jennifer L. Jordan

School of Materials Science & Engineering
Georgia Institute of Technology

ASM Chapter Meeting
Tuesday Evening, Feb. 19, 2002

Main Presentation: 8:00 PM
Costs: \$20.00 Regular, \$6.00 Students

Wine Reception & Social: 6:00 PM
Dinner: 6:45 PM
Introductions & Business: 7:30 PM
Student Presentation: 7:45 PM

MENU: A dinner menu of Georgian Pecan Crusted Chicken, Caesar Salad, Roll and Butter, Coffee (regular and Decaf), Iced Tea, Pecan Pie dessert, Vegetarian dinner available upon request. Wine - extra charge

WHERE -- Georgia Tech Ferst Place Cafeteria, 3rd floor of Student Center Building (next to the campanile). Parking is available at the Student Center visitor parking lot off Ferst Drive.

Reservations: RSVP - by noon on Monday, Feb. 18, 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.

Abstract:**Probability of Failure Analysis for Fracture Critical F-22 Titanium Castings, by T. R. Brussat, P. J. Caruso, and D. A. Ulman**

F-22 Structures, Lockheed-Martin Aeronautics Company, Marietta GA 30068-0987

Flaws inherent in the casting process present a unique challenge for maintaining damage tolerance of Titanium cast parts used in fracture critical F-22 airframe structure. Shell inclusions, in particular, are crack-like, can be difficult to detect, and occur frequently. Flaw size can occasionally approach 0.50 inch. Based on demonstrated radiographic non-destructive inspection (NDI), the conventional 0.05-inch assumed initial flaw size for damage tolerance was increased significantly for shell flaws. Even so, the 2-lifetime analysis with these increased initial flaw size assumptions was not, by itself, considered adequate to ensure the required minimum probability of failure (PoF).

This paper describes a detailed PoF analysis conducted to establish shell flaw frequency limits and thereby assure that the assumed initial flaws are infrequent enough to be considered ‘rogue’ flaws. The PoF analysis requires the following data:

- Flaw size occurrence distribution
- Effective crack size (includes brittle reaction “halo” around the flaw)
- Probability of detection (PoD) of each supplier’s shell material versus thickness
- Effect of shell orientation on PoD
- Parametric descriptions of all critical zones within each cast part
- Life estimation method for all possible combinations of flaw size, location, and orientation in each critical zone

These inputs are combined to estimate the average number of shell defects for all castings that would result in a per-flight PoF less than 10^{-7} . Rejection criteria are then established based on the number of flaws detected, to assure a lower average number per casting is maintained.

Abstract:**Effect of Shock-Activation on Post-Shock Reaction Synthesis of Ti-Based Ternary Carbides, Ti_3SiC_2 and Ti_2AlN , by Jennifer L. Jordan**

The effect of shock-compression of titanium, silicon carbide, and graphite and titanium and aluminum nitride powder mixtures on subsequent reaction synthesis and formation of Ti_3SiC_2 and Ti_2AlN was investigated in this study. Ti_3SiC_2 is a novel ceramic with metal-like

properties, namely, high electrical conductivity and plastic-like deformation. The powder precursor mixtures were shock-densified at different pressures using 80-mm diameter gas gun and double implosion cylinder techniques. Characterization of the shock-densified compacts showed an intimately mixed state of powders with little or no reaction. The subsequent reaction behavior of the shock-densified compacts was studied via heat treatments and differential thermal analysis (DTA) at varying heating rates. Activation energies were obtained from these DTA studies and correlated with measurements of fraction reacted as a function of time and temperature to determine the reaction mechanism(s) and degree of activation caused by shock compression. This paper will present the results of the reaction mechanisms and the effects of shock compression on the kinetics of reactions leading to the formation of the ternary carbide in the shock-densified precursor powders.

Jennifer Jordan graduated with her Bachelors of Science in Materials Science from Georgia Tech in May of 1998 and her Masters in December of 1999. She is currently pursuing her Ph.D. in Materials Science under the advisement of Dr. Naresh Thadhani. During the fall of 1999, she worked at Philip Morris, USA researching iron aluminide intermetallics. She is active in the Graduate Student Senate and MSE Umbrella Society at Georgia Tech. She is also working on the Ferst Center for the Arts student advisory board and the Friends of DramaTech.

**Atlanta ASM Chairman's Message
by Kim Bryan Spinsby**

Time is very short for submitting applications for the **2002 ASM Materials Camp**. Please read the notice concerning materials camp later in this issue of *ASM-Atlanta*. The local high school student who was nominated by the Atlanta Chapter to attend Materials Camp last year was **Josh Sofsky**. Josh and his parents have been invited, and have agreed, to attend the March meeting of the Chapter where he will make a 10-minute presentation describing his experience last summer at Materials camp. Josh is now seriously considering a Materials Science career and, perhaps, Georgia Tech for his education.

You may recall that the Atlanta Chapter of ASM International provides two scholarship awards to outstanding Georgia Tech Materials Science & Engineering Students each year. The ASM Chapter Chairman makes these awards to one Graduate student and to one Undergraduate student at the April Awards Luncheon at GA Tech. The total value of the two scholarships has been \$750. The candidates for these awards are currently being reviewed. The Atlanta Chapter of ASM would clearly like to greatly increase the value of awards to deserving students in order to encourage and assist their work. Unfortunately, the Chapter's funds are very limited and even the current small amount for the

awards is a bit of strain on the budget. I would like to appeal to the overall membership of ASM and to the Materials industry in Georgia and adjoining states for help in greatly increasing the funds that the Atlanta Chapter can devote to student scholarship awards. We will appreciate donations from members and corporations to help fund these scholarships. Please send (tax-exempt) donations to the Chapter Treasure, James Lane, or else contact me or our chapter finance Chair, Dr. John L. Mihelich. The addresses and contact numbers for each of these people are listed on the last page of this newsletter.

Professor Thadhani, who serves on the national educational committee, indicated that the ASM Headquarters might be looking for still a third site for Materials Camp. He indicated that Atlanta could be a potential site to host a camp. The cost of hosting a camp for 20 students for one week would be approximately \$20,000.00. According to him, getting some financial help from GA Tech is not possible this year. However, the Chapter needs to explore possibilities of hosting a camp for next year.

In addition, The Atlanta Council of the Boy Scouts of America is planning an Engineering Academy to be located at Georgia Tech for one week during this summer. They have approached members of the Atlanta Chapter of ASM for assistance in the program planning of this event and three members of the Chapter's Executive Committee are serving on this program planning committee. We would appreciate input with ideas, resources, etc. from the overall membership about making this academy both effective and successful.

The Chapter's Executive Committee is also considering offering a materials Continuing Education Program. There are many courses that might be offered, such as "Metallurgy for the Non-Metallurgist", "Critical Behavior of Electronic Materials", etc. We need input from materials people and industry in our geographic area to know if this effort would be useful to them. Again, please contact me.

Summer Research Experiences for Teachers - GIFT 2002 "Materials World" Fellowships by Prof. Naresh Thadhani

Friends: Please help in bringing this announcement to the attention of high school teachers, councilors, and principals, that you may have contacts with. Thanks, Naresh.

Dear Principal, Councilor, Teacher:

We are pleased to announce the GIFT 2002 "Materials World" Fellowships at Georgia Institute of Technology, in Atlanta. The Fellowships, funded by the National Science Foundation (NSF) under the Research Experiences for

Teachers (RET) program, are available for high-school math and science teachers interested in experiencing hands-on participation in research, while working with faculty and research scientists in the School of Materials Science and Engineering (MSE). A total of six GIFT 2002 "Materials World" Fellowships will be awarded. Subject to availability of funds from NSF, one or two GIFT projects may involve a 6-week travel to an international research experience site at institutions in Japan, Korea, or Hong Kong.

The "Materials World" GIFT Fellows will receive a stipend of \$625 per week, up to 10 SDUs, and an allowance for supplies/equipment for materials module development to take back to their schools.

Information about the GIFT 2002 program may be obtained by contacting **Mr. James Rayford**, Tel: 404-894-7530, Fax: 404-894-9675, or email: james.rayford@ceismc.gatech.edu. An online application can be found at: <http://www.ceismc.gatech.edu/ceismc/programs/gift/homepg.htm>

We hope that this program will be of interest to you and/or colleagues at your school, should your summer schedule permit. If you need more information, please do not hesitate to contact us. **Naresh N. Thadhani**, Professor, MSE, Tel: (404) 894-2651
email: naresh.thadhani@mse.gatech.edu
<http://www.mse.gatech.edu/>

Researching Durability of Aerospace Materials by Shelby Highsmith

The graduate students working under **Prof. Steven Johnson** are engaged in work covering a range of materials systems, but all have a common goal: understanding damage in, and predicting the durability of, aerospace materials.

This team of students in the Mechanical Properties Research Lab (MPRL) at Georgia Tech is unofficially divided into two groups: the "metals group" and the "composites group," with each team collocated to aid in the exchange of relevant research information. The composites group – **Kyle Berkowitz, Tim Long, Ben Findley, Ryan Melcher, Jason Craft, and Matt Pavlick** – investigates damage in fielded as well as advanced composite systems, and the metals group – **Amanda Davis, Shelby Highsmith, Doug Bahr, and Scott Shipley** – are currently focused on fatigue, fracture, and creep mechanisms in high temperature turbine superalloys.

Delta Airlines is sponsoring Kyle's research into fatigue damage in composite structures used in flight control surfaces – in this particular instance, the 757 rudder. His

work investigates environmental aging and temperature effects on the fracture and fatigue facesheet debonding of a carbon/epoxy-Nomex honeycomb sandwich structure. Tim's research combines metallic and polymer matrix composite (PMC) materials to produce a hybrid titanium composite laminate (HTCL); he is studying the impact resistance and post-impact strength of such materials for tough but lightweight aircraft structural applications (such as engine nacelles and fuselage skins). Jason is following the renewed interest in metal matrix composites (MMC) for the next generation reusable launch vehicle (RLV); his NASA-funded work examines new NiAl and TiAl matrix materials (SiC fiber reinforced) for high temperature structural applications. Damage mechanisms in elevated temperature static and fatigue loading will be investigated, and computer modeling of different lay-up characteristics will be performed. On the other end of the temperature spectrum, Matt and Ryan are studying new possible PMC and adhesive materials for the cryogenic fuel tanks of the next generation RLV. Material properties and damage mechanisms will be assessed in cryogenic (liquid N₂, approx. -400F) conditions, as well as at the elevated temperatures (approx. 400F) of re-entry. The effects of thermal cycling between the two temperature extremes will also be studied; plans are in the works for developing the test rigs required to enhance the MPRL's cryogenic testing capabilities. Should any damage to the fuel system's composite components occur, Ben is studying candidate coatings for the PMC's that will improve their impact damage resistance as well as sustain their fluid integrity in the presence of microscopic damage. He is performing impact tests on coated and uncoated specimens, and then assessing their integrity under high pressure helium using a special permeability test rig. Matt, Ryan, and Ben are all also funded by NASA.

Back in the realm of terrestrial applications, Amanda, Shelby, Doug, and Scott are all working on projects funded by General Electric Power Systems, and are focused on the integrity of hot-section rotating turbine engine components. Amanda is building on the work of her advisor in the area of fatigue crack population regression, using field inspection data from GE to develop statistical models for initial part quality (or equivalent initial flaw size distribution) and time to crack initiation. Her work will serve as a good initial condition for Shelby's models, which will use a probabilistic fracture mechanics algorithm to predict fatigue crack growth (FCG) in turbine blades through various load cycles and inspection intervals. He is building his statistical material database through repetitive FCG testing in directionally-solidified (DS) nickel-base superalloy panels, across a matrix of temperatures and load ratios. For even hotter applications, Doug and Scott are characterizing the damage mechanisms in a single crystal (SC) nickel-base superalloy through tension, creep, fatigue, fracture toughness, and fatigue crack growth testing. Shelby, Doug, and Scott will all be testing – and possibly

expanding – the MPRL's envelope of high temperature testing and complicated instrumentation!

From ground-based power generation to atmospheric and orbital flight, these ten students span the gamut of damage mechanics and structural integrity research. Any questions about the MPRL or the aforementioned research should be directed to **Prof. Steven Johnson** in the Materials Science & Engineering department at Georgia Tech, (404) 894-3013, or steve.johnson@mse.gatech.edu.

Semi-Solid Metal Casting by **Dr. John L. Mihelich Ph.D.**, Metal Experts Int'l, Winston Georgia

Typically, aluminum alloys are processed either in the solid state by wrought processing methods such as rolling, forging, or extrusion, or in the liquid state by casting methods, such as die, sand, or permanent mold casting. There is a third option, however, called **semi-solid metal (SSM) casting**, in which the alloy is processed in a state of part liquid and part solid, and this can provide some significant advantages for producing aluminum alloy parts. This review provides some background on the SSM process and its advantages, typical applications, and challenges and opportunities for the future.

Semi-solid metal (SSM) casting of aluminum is a technology that has been practiced for over 25 years. It was discovered at MIT in the early 1970's and termed **rheocasting**. From a technical standpoint, this process takes advantage of the characteristic of a semi-solid aluminum alloy that when stirred or subjected to shearing forces, the material is said to become thixotropic, meaning that it can flow like a liquid. Yet prior to shearing, the SSM alloy has adequate strength for robotic handling, facilitating transfer from the heating furnace to the shot sleeve. The unique properties of thixotropic aluminum alloys are often illustrated by the demonstration in which a semi-solid billet is cut with a butter knife as shown in Figure 1. Because the semi-solid alloy is thixotropic at molding temperature, it flows into the die smoothly without entrapping gases. In contrast, the high-pressure die casting process sprays molten metal into the die, which can lead to higher levels of porosity. In addition, because of the high solids content and the much lower temperatures involved with SSM casting, shrinkage porosity is also minimized.

Key to the success of the SSM casting process is a starting material with a non-dendritic globular microstructure. Various technologies exist for producing so-called SSM billets, including a controlled billet casting process in which magnetic stirring of the solidifying billet is used to break up the typical dendritic cast structure. A competing billet casting process uses a highly grain-refined alloy and a fast solidification rate to achieve an ultra-fine grain size in the billet. When reheated into the two-phase, liquid plus solid region prior to casting, the ultra-fine grain billet and

the billet cast from the mushy semi-solid material, behave in a similar way. The grain boundary regions melt first and the remaining solid, in the form of spherical alpha particles, gives a semi-solid “mush” which can be shaped into the desired part. A new wrinkle is to make the SSM mushy feed just ahead of the die-casting machine by a careful balancing of cooling and heating of the input liquid. This technique has been termed direct slurry forming or the DSF process.

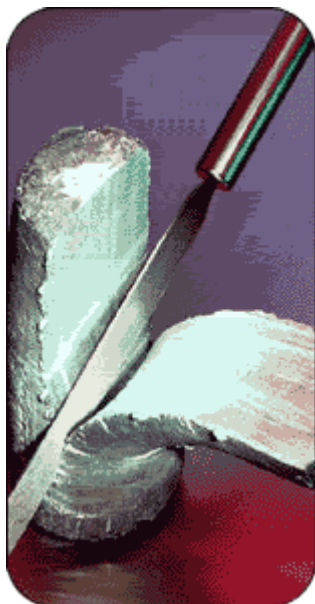


Figure1: Butter Knife Slicing Through Semi-Solid Aluminum. Refer Forecast, Inc.

SSM produced parts are of very high quality, being pressure tight and exhibiting excellent structural integrity. Quality-wise, SSM parts are often compared favorably to squeeze cast components. In general, the alloys most commonly used for SSM processing are 356 and 357. Recently, SSM billets in 319 and 390 alloys have been introduced as well, providing a wider range of material options. SSM processing of aluminum for automotive applications started in the early 1990's. The process is now being practiced around the world. In the automotive industry's quest for weight reduction, the ability to make thin wall



Figure 2: Toyota Actuator Casting in Semi-solid Aluminum. Hot Metal Molding, Inc.

castings (down to 2 to 3 mm) with good structural integrity offers a considerable advantage over other processes. Fuel rails are the largest volume automotive part in production today and, as critical components in fuel injection systems, must be pressure tight. Application of SSM in fuel rails is a prime example of the high quality capabilities of the process. In Europe, rear axle SSM aluminum alloy castings have replaced ductile iron parts saving weight and demonstrating the high structural integrity of this process. SSM engine brackets, hydraulic system and air conditioner components, and subframe assemblies have all been successfully produced using the SSM process. An actuator part produced for Toyota Motors is shown in Figure 2. Primarily based on automotive requirements, shipments of SSM products are now approximately 30 million pounds per year, and are expected to grow at a rate of upwards of 10% per annum.

Thixomolding®:

A novel process method that has been developed for producing parts from magnesium is called Thixomolding®. It uses a modified plastic injection molder to make magnesium alloy parts that are being used in the electronics/communications, hand tool, and automotive industries. Metal alloy bits are feed into the heated barrel and a screw, which also provides the shearing forces, advances the material while it is heated into the semi-solid state. When sufficient mushy metal is in the accumulation zone at the front end of the barrel, which is inerted using argon gas, the screw is hydraulically advanced to shoot the semi-solid alloy into the die. A cycle time of 30 seconds or less, coupled with the ability to make a net-shape part, makes this process attractive economically. It also offers a user-friendly environment since the molten metal is wholly contained in the barrel.

Aluminum Thixomolding® is currently under development on a commercial size thixomolder. As molten aluminum will react with conventional steel, the design of the barrel and screw must rely on materials of construction which are resistance to this corrosive environment and still be robust enough to handle the repeated thermal and impact shocks associated with operation of the unit. Considerable progress has been made to overcome these obstacles and aluminum trials on a commercial scale are planned to begin in 2002.

A variety of technical challenges remain for SSM casting to continue to gain increased use in a broader range of applications. Raw material cost of the billet feedstock and yields in the range of only 50% contribute to the high manufacturing cost of SSM parts. However, these castings are high quality, net-shape parts, that require little or no machining or finishing which can more than offset the higher manufacturing costs. The DSF process, which has

recently been introduced, may significantly reduce the costs of producing the SSM feedstock that will favorably impact the economics of SSM castings.

There are a number of sources for further information regarding the SSM casting process and products. These include:

- The Semi-Solid Metal Forming (SSMF) Consortium at Worcester Polytechnic Institute has more than 40 organizations devoted to a cooperative effort to technically advance semi-solid processing technology. <http://www.wpi.edu/Academics/Research/ACRC/meetings.html>
- The North American Die Casters Association (NADCA) is a trade association committed to the advancement of die-casting processes. This group supports university and industry work on SSM technology. <http://www.diecasting.org/research/projects.htm>
- Ormet Aluminum is a producer of SSM billet. Proceedings of the SSM World Conference that they sponsor are available through their web page: <http://www.ormet.com/ormet/news.html>
- Formcast is a SSM parts maker who is affiliated with Ormet. Visit their web page to get a view of their capabilities. <http://www.formcast.com/>
- Northwest Aluminum is producing the highly grain-refined billet used for SSM parts. More information is available on their web site. <http://www.nwaluminum.com/Article1.htm>
- Hot Metal Molding is a SSM parts maker. Learn more about their capability from visiting their web page. <http://www.hotmetalmolding.com/>
- Thixomat is developing aluminum Thixomolding® and you can get in insight into this technology on at their web site. <http://www.thixomat.com>
- AEMP produces SSM billet and also manufactures SSM components. An overview of this company is available at their web site. <http://www.nationjob.com/showcomp.cgi/aemp.html>

In the constant competition for the best combination of product properties and cost, the SSM casting process has an important niche to fill.

About the Author: Dr. John L. Mihelich, FASM is the consulting Metallurgical Engineer at Metal Experts International located in Winston, Georgia. He specializes in technical and market development, market analysis and in problem solving for domestic and international metal industry clients. In addition, he serves as a sales agent in North America for the Aluminum Powder Company (ALPOCO), marketing aluminum powder, granules and needles. Dr. Mihelich is a Director of, and consultant to, Thixomat, Inc the technology leader in semi-solid molding of Magnesium alloys.

His previous industrial experience includes Comalco Aluminum of Australia, Amax Performance Materials, Climax Molybdenum and LTV Steel.

Dr. Mihelich holds BS, MS, and Ph.D. degrees in Metallurgical Engineering from Case Western Reserve University. He is an Adjunct Professor of Materials Science at Clemson University. He has been recognized as an ASM International Fellow for "outstanding metallurgical and technical market development in high strength low alloy steels". Dr. Mihelich was a Woodside Lecturer and received the John H. Shoemaker Management Award of the Detroit Chapter of ASM International. The author can be contacted via e-mail at yodonna@aol.com.

Materials Positions Available or Needed

ASM member desires position

- 16 years of direct sales engineering experience in the Southeast region selling materials testing instrumentation to industrial, academic, manufacturing, government, commercial testing, and research type organizations.
- B.S. in Chemical Engineering.
- experience with writing and negotiating contracts, performing formal presentations, ability to develop and qualify new prospects, and a demonstrated proficiency with the entire sales process.
- possess excellent business aptitude including strong customer relationship building skills with proven success in applying product knowledge to conduct a thorough customer needs analysis.

Contact the *ASM-Atlanta* Editor, Bill Livesay, at livesay3@bellsouth.net or 770-664-8742 and he will put you in contact with the individual seeking position.

LabVIEW & Stress Engineering Seminars in Atlanta

These items are listed since members may be interested in learning about automating instrumentation. National Instruments is offering two local free hands-on Seminars. The first is a Virtual Instrumentation Seminar on LabVIEW and PXI Hardware Tools on Wednesday, February 13, 2002 in Norcross, GA. In the second seminar, you learn about different types of signal conditioning through participating in hands-on exercises. The hands-on exercises consist of configuring SCXI hardware to work with the following transducers: Strain gauge, LVDT, & Accelerometer. This seminar is Thursday, February 21, 2002. Even though free, space is limited and you have to register for the seminars. Contact National Instruments at:

<http://www.ni.com/seminars/usa.htm>, or e-mail: mailto:ni.register@ni.com, or call toll-free (888) 444-3539

ASM Materials Camp

ASM Materials Camp is a 5-day, lab-based learning experience for 30 students entering their junior or senior year of high school, interested in exploring a possible career in materials science or engineering. The ASM International Materials Camp has been a very successful program. **The Atlanta Chapter has been able to place a high school student from the Atlanta Area in the ASM International camp during each of its first two years of operation.** We would like to do this again in 2002. However, we need the help of the ASM membership to make this opportunity known as widely as possible so that qualified youth high school students can become aware of this fine opportunity. Do you know a bright young person who might qualify and be interested? Perhaps your own child, a neighbor, a school mate of your child, etc.

Time is short for the application process since the deadline for final submission to ASM International is **March 15, 2002**. Send your suggestions to the Atlanta Chapter Chairman, **Kim B. Spinsby**, 770-740-3185V; 770-740-3050F, kim.spinsby@sea.siemens.com. The chapter needs suggestions soon to have time to interview candidates, etc.

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 opens 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

- * High school students. There are no geographic restrictions.
- * Highly motivated inquisitive learners with math and science aptitude.

ASM Materials Camp cost the student absolutely nothing. Students receive free travel, housing, meals, tuition, entertainment and knowledge.

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.

Please call **Kim Spinsby** at 770-740-3185V, or email at, kim.spinsby@sea.siemens.com with your suggestions or comments.

Future ASM Chapter Programs

by Subu Shanmugham

March 19, 2002 Industry Night

Please join us for this exciting event where we are planning to showcase three companies from the Atlanta area. Dr. Jorge Ayala, Director, Product Technology of Columbian Chemicals and Mr. Peter Weissman, Manager, Technical Service and Applications, Industrial Coatings of UCB Chemicals have agreed to present. The third local company to present will be announced in the March ASM-Atlanta.

April 16 Dinner Meeting

ASM Trustee, Kathleen Alexander of Los Alamos National Laboratory will be the guest speaker for this meeting.

Atlanta Chapter Sustaining Memberships

Chromalloy Georgia became the first **Chapter Sustaining Member** of our ASM-Atlanta Chapter during the Spring of 2001.

Contact the Membership Committee Chair: **Jud Ready**, MicroCoating Technologies, 5315 Peachtree Industrial Blvd., Atlanta, GA, 30341, 678-287-3969; jready@microcoating.com. Your organization's commitment to this program will provide a valuable contribution to the education and development of young materials scientists and engineers.

Update Your Record at ASM International

<http://www.asminternational.org>

ASM International requests that each member go to the ASM web site to verify your addresses, etc. Use your member number, found on your ASM Membership card or a mailing label, to access your personal record. Find this page under "For Members Only".

The Features of ASM-Atlanta include:

- 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.)

Note: If you do not also receive this newsletter via your email, it means we don't have your email address. Please address an email message to livesay3@bellsouth.net and simply type ASM Newsletter in both subject and body. We eventually wish to migrate to much greater email distribution of the newsletter to help control costs. Thanks, BL.

Atlanta ASM Chapter Officers

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John L. Mihelich: Past Chair & Finance Chair,

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