



ASM - Atlanta

Newsletter of the Atlanta Chapter of ASM International

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

April, 2001

Volume 7

Number 8

Meeting of the Atlanta Chapter of ASM

Tuesday Evening, April 17, 2001

At the Georgia Tech Ferst Place Cafeteria,

PROGRAM

Material Challenges – 21st Century

presented by **Dr. Subi Dinda**

Daimler-Chrysler Corporation

Fellow & Trustee, ASM International

also

High Efficiency Ribbon Silicon Solar Cells

A 10 minute Ph.D. student presentation by **Vijay Yelundur**

ASM Chapter Meeting

Tuesday Evening, April 17, 2001

Wine Reception & Social: 6:00 PM

Dinner: 7:00 PM

Introductions & Business: 7:50 PM

Student Presentation: 8:00 PM

Dr. Dinda's Presentation: 8:15 PM

Costs: \$20.00 Regular, \$6.00 Students

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 11:00 AM on Monday, April 16, to Marlene White, Tel: (404) 894-2850, Fax: (404) 294-9140, marlene.white@mse.gatech.edu

Note: A policy of ASM International is that one never pays to attend a regular Chapter meeting program. So, if you desire to eat elsewhere, you remain very welcome for the program.

Driven by global environmental concerns and increasing energy consumption there is a growing demand to manufacture safer and lighter vehicles with reduced emissions and better fuel economy. Hence, this is an immediate need for use of innovative designs and new emerging materials in the manufacturing of 21st century vehicles. After highlighting the past and present trends of materials usage in the automotive industry, this presentation will address the material challenges, technology needs and the impact on cost and environment for manufacture of future vehicles. To meet these challenges, it is foreseen that the vehicle of the future will be manufactured from many different materials, each chosen based on its cost, function and performance. Lastly, an update on the status of various material technologies will be presented.

Abstract: Material Challenges – 21st Century

The Future of Aluminum in the Automotive Industry: In order to meet future fuel economy and emission regulations, extensive use of aluminum for body structure, body closure panels, powertrain, and suspension components will be required. The applications of aluminum have been increasing every year. High volume production has been limited to hoods, powertrain and suspension applications. To date, wide use of aluminum body structures has been limited to low volume niche vehicle applications.

The application of aluminum on high volume production vehicles results in a significant cost penalty due to higher raw material costs and increased manufacturing cost. There are many technical challenges that must be resolved to reduce the “cost gap” between aluminum and steel which is predominately used in current high volume production vehicles.

This presentation will discuss the challenges and solutions that are required to reduce the “cost gap” and provides a roadmap for increased applications of aluminum in the future vehicles.

Biography: Dr. Subi Dinda is senior manager of Advanced Manufacturing Technology Development in the Liberty and Technical Affairs Department of Vehicle Engineering, DaimlerChrysler Corporation. He is responsible for the major advanced materials and manufacturing process development programs for the corporation. He is the current chairman of the corporate Aluminum Tech Club and represents DaimlerChrysler Corporation as a member of the Materials and Manufacturing Teams of the Partnership for a New Generation of Vehicles (PNGV) under USCAR.

Dr. Dinda received his B.S. in metallurgy in India and both his M.S. and Ph.D. in materials engineering from Illinois Institute of Technology, Chicago. He received his M.B.A. from Central Michigan University, Mt. Pleasant, Mich.

Since joining Chrysler in 1973, Dr. Dinda has been involved in the development of new material applications for Chrysler vehicles. He has significant experience in steel, aluminum, and composite materials and has transferred new materials and manufacturing technologies from the laboratory to the plant floor. Dr. Dinda has published more than 20 papers, co-authored books, holds patents, and has presented more than 125 technical papers at domestic and international conferences.

A member of ASM since 1966, Dr. Dinda was elected a Fellow in 1990. He is a Life Member of the society. He has served on the Advisory Awareness Council and is past chair of that group. He is an executive member and past chair of the Detroit Chapter. He is also a past president of the Deep Drawing Research Group, and an executive member of the Society of Automotive Engineers.

Abstract:

High Efficiency Ribbon Silicon Solar Cells

The U.S. Photovoltaic Industry Roadmap has identified the development of 18% efficient, manufacturable thin silicon solar cells as a top R&D goal to be achieved in the next 3-10 years. Commercial ribbon silicon materials such as edge-defined film-fed growth (EFG), dendritic web, and String Ribbon silicon may offer the substrates of choice to meet this goal because thin (~100 micron) wafers can be grown directly from the melt, eliminating losses associated with wafer slicing and etching. While the low-cost growth of ribbon silicon wafers makes them attractive for photovoltaic substrates, the as-grown minority carrier lifetime is typically in the range of 1-10 ms, which is not suitable for high efficiency cells (greater than 15%). The aim of research in ribbon silicon photovoltaic materials is to raise the lifetime using manufacturable processes.

Vijay Yelundur; University Center for Excellence in Photovoltaic Research and Education, Georgia Institute of Technology, School of Materials Science and Engineering
gt4166b@prism.gatech.edu, 404-894-3630

Atlanta ASM Chairman's Message by John L. Mihelich

At the 17 April meeting, Dr Subi Dinda of DaimlerChrysler will be here to give us his views of materials trends in the automotive industry and an update on what is happening on the national scene. Subi is a trustee of ASM and a long time, active member of the Detroit Chapter. The abstract of his presentation and his bio sketch are presented near the beginning of this NewsLetter. Your attendance is encouraged for what should be a very interesting and informative evening.

Subu Shanmugham is leading the effort to have local corporations step up to become Sustaining Members of our Chapter. The cost is a nominal \$200 and it gives the corporation good visibility in the local materials community by exposure in our Newsletter and in the forthcoming Directory/Yearbook. Encourage your company to consider this investment for the future

Speaking about the Directory/Yearbook, Bill Livesay and Kim Spinsby are pulling together the input that the membership supplied earlier. Working over the summer, they are planning to publish the booklet in September 2001. So if you have not supplied information for presentation in the Directory or if you need to do a last minute up-date, please contact Bill or Kim straightway.

Kim also reports that he has two, maybe more, potential candidates to represent the Chapter at National's Materials Camp in August. Looks like one lucky high school student may be making their way out to Seattle for this weeklong event. The Camp is an annual event, a least for the last 2 years, so keep it in mind if you know a “star” high school

senior or junior with interest in the materials field for Materials Camp 2002.

The Executive Committee has reviewed the revisions and approved the Chapter Rules/Bylaws that were prepared by Bill Livesay. Thanks again Bill! The Rules have been sent to National for their consideration. Following Nationals' approval, the Rules/Bylaws will be released to the Chapter membership. The Annual Meeting in May will then follow these Rules and officers will be elected to serve the 2001-01 term. Our Nominating Committee is preparing a slate of candidates and members can also nominate candidates from the floor – just check, in advance, with the nominated individual(s) to assure that they are willing to serve

Greg Kennedy, our Communications & Web Site Chair, is in the process of up-dating the Chapter web page. He says it will be bigger and better with more information available to the members. Check it out!

Please remember that we are targeting our meeting attendance at a level of 30. It would be excellent to break this barrier again for the Trustee visit on the 17th. The Georgia Industry Night dinner meeting, our Lucent tour and the Holiday Bash all met this challenge. While the Bonnell extrusion plant tour on 20 March was excellent our participation was a bit on the lean side – yet still very good. Let get a big turnout for Dinda!

Many of us have found that our meetings and tours offer an excellent opportunity to network with peers from Tech and from industry. It is a great way to stay on top of what is happening locally in the materials field. Why not bring a colleague along too, to experience the fellowship of your ASM Atlanta Chapter!

Ben Church Selected for Award

Ben Church has been selected to receive the **ASM-Atlanta Chapter's Graduate Student Award** for the 2000/2001 academic year. Ben has actively participated in student chapter activities, and has outstanding academic and research accomplishments. He is the President of the ASM/TMS student chapter and has assisted the Atlanta Chapter with educational outreach activities and with demonstrations for high school students and teachers. Ben joined the graduate program in Materials Science and Engineering at Georgia Tech during the Fall of 1999. He has maintained a 4.0 GPA and has excelled in research. We are sure to see him continue to be active in student chapter as well as the Atlanta chapter activities in the coming years. Mr. Church was strongly recommended for this award by the MSE faculty, and past and present student chapter chairs. Along with the high honor of receiving this presentation at the Georgia Tech Awards ceremony on April 17, the graduate student award includes a certificate from ASM-Atlanta, a \$250 cash prize, and \$250 worth of ASM publications of Ben's choice.

ASM-Atlanta Web Site

Greg Kennedy, Chair

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

Technical seminars, job openings, jobs needed & other issues occur at any time. The Atlanta Chapter of ASM maintains a web site that belongs to you, the Chapter membership. This web site can be a valuable and timely vehicle for sharing information. If you have an appropriate item for posting on the Atlanta ASM Web site, discuss it with **Greg Kennedy**, our Web Site Chair. Greg is currently taking significant steps towards redesigning the web site into, in his words, "a dynamic useful tool for chapter news and events". Reach Greg at: GA Tech, Atlanta GA, 30332 gte290r@prism.gatech.edu 404-894-1475V; 404-894-9140F

Georgia Tech ASM Student Chapter Receives Award

The ASM Foundation has recognized the GA Tech student chapter for their student outreach activities encouraging young people to careers in the material field. Congratulations to the Student Chapter leaders and membership for getting this recognition.

Jud Ready Now Back in Atlanta

Jud & Jamie Ready announced the birth of **Vivian Elise Ready**, born @ 6:04pm 03/02/01; 7 lbs. 3 oz. and 20.5" long. Many Atlanta ASM members had enjoyed knowing Jud while he was earning his PhD in Materials the last several years. He served as Chair of the GT Student Chapter of ASM. Jud is now back in Atlanta and in a new job (Microcoating Technologies) and says he is "looking forward to getting back into the ASM-Atlanta thing once the home life gets more set in a routine". Jud has also promised to tell us more about his new work when he has some time. Welcome home, Jud & Jamie.

Atlanta Chapter Sustaining Memberships

The Atlanta Chapter of ASM is strongly encouraging companies and other organizations having materials related interests to sign up with the Chapter's Sustaining Membership program. Contact **Subu Shanmugham** MicroCoating Technologies, 5315 Peachtree Industrial Blvd., Chamblee, GA 30341 678-287-2417V; subu@microcoating.com

International Reliability Physics Symposium April 30 – May 3

The 2001 International Reliability Physics Symposium is being held at the end of this month on this side of the US for the first

time in several years. The site is the Wyndham Palace Resort & Spa, Lake Buena Vista, FL April 30 – May 3, 2001.

The tutorial program will be held on Monday, April 30. Tutorial topics are organized into introductory, product, circuit and device reliability tracks. The topics presented include reviews of the latest findings in several important reliability fields, together with overviews of several newer specialized areas of interest.

The technical program starts on Tuesday at 8:00am. The first session is plenary and focuses on product reliability. In the afternoon there are two tracks of papers: one on process and reliability interactions, the other on MEMs reliability and packaging issues. The process reliability session is comprised of several papers on non-volatile memories (NVM). This is due to the drive toward smart electronics and the expanded use of embedded NVMs which fulfill this void. MEMs continue to be an emerging field as companies attempt to take laboratory innovations into the marketplace. The packaging session includes the best paper from the ESREF conference.

On Wednesday morning, there are parallel sessions on oxide break-down and optoelectronics. Consistent with the ever-pressing dielectric reliability issues there will be two invited papers on ultra-thin oxide breakdown modeling. These papers include “Defect Generation and Reliability of Ultra-thin Silicon Dioxide at Low Voltage” by J.H. Stathis and D.J. DiMaria and “Identification of Atomic Scale Defects Involved in Oxide Leakage Currents” by P.M. Lenahan et.al. This is followed by parallel sessions on fast wafer level reliability used for interconnects and ESD/Latchup.

Wednesday afternoon will also have parallel sessions on product reliability, failure analysis, process-induced plasma damage and inter-connect reliability. The failure analysis session includes the paper “Novel FA Techniques Used to Recover EEPROM Data from the Swissair 111 Crash.” Interconnects made of Cu and surrounded by low-k dielectric, which increase chip speed, are the focus of the interconnect reliability session. The plasma damage session has a paper showing the relationship between transistor damage and product reliability.

On Thursday, the program reverts to plenary sessions. The morning has a very strong session on ultra-thin oxides as the reliability of ultra-thin oxides continues to be an issue for the industry. This is followed by the panel discussion “Is Burn-In elimination possible?” Above description by the technical program Chair: Eric S. Snyder. <http://www.irps.org/>

SUPERCONDUCTIVITY IN MgB_2

2001 MRS Spring Meeting

CALL FOR PAPERS FOR LATE NEWS SESSION

Note: Abstracts Requested by April 12

A special late-news session on the synthesis, materials properties and potential of the new MgB_2 type superconductors will be held at the 2001 MRS Spring Meeting in San Francisco on Tuesday evening, April 17, beginning at 7:30 p.m. in Golden Gate B of the Marriott Hotel. In addition to several overview talks, presentations are anticipated from many leading institutes. Further details will be provided as available on the MRS Web site (www.mrs.org) as well as at the meeting.

Since the discovery of superconductivity in magnesium diboride at 40 K by Akimitsu and co-workers, remarkable progress has been made in the understanding of the fundamental properties of this material. Studies of the isotope effect, electron tunneling, transport properties, thermodynamic properties, and electro-magnetic

properties all point to this material being a classical superconductor with an uncommonly high transition temperature, with essentially weak-link-free grain boundaries and high critical current capability. Substantial strides have been made in preparing high quality material in both bulk and thin-film form.

Abstracts must be submitted via e-mail by April 12, 2001, to each of the five session organizers: Doug Finnemore, Ames Laboratory, finnemor@ameslab.gov, (T) 515-294-3455; Chang-Beom Eom, University of Wisconsin-Madison, eom@engr.wisc.edu, (T) 608-263-6305; Fred Mueller, Los Alamos National Lab., fmm@lanl.gov, (T) 505-667-9244; Sungho Jin, Bell Labs., jin@agere.com, (T) 908-582-4076; and Tomas de la Rubia, Lawrence Livermore National Lab., delarubia@llnl.gov, (T) 925-422-6714.

Submittals should include a brief (250 words or less) description of the work, the names and affiliations of the authors, and complete contact information (phone, fax and e-mail) of the principal author.

CALL FOR STUDENTS

A New Program at The University of Tennessee in Materials Lifetime Science & Engineering

The University of Tennessee recently was awarded a five-year 2.7 million dollar grant from the National Science Foundation (NSF) to establish an Integrative Graduate Education and Research Training (IGERT) Program in *Materials Lifetime Science and Engineering*.

The Program involves extensive education and research collaborations among three universities (The University of Tennessee, Lehigh University, and Rutgers University), a prominent national laboratory (Oak Ridge National Laboratory), and four industrial companies (Engineering Technology Center, Analysis & Technology, Inc.; Boeing Company; General Electric Company; and Haynes International, Inc.).

The NSF IGERT Program represents a joint effort of 29 scientists and engineers from the above universities, national laboratory, and industries, with faculty participants being drawn from nine different academic Departments: Materials Science and Engineering; Mechanical and Aerospace Engineering, and Engineering Science; Mechanical Engineering and Mechanics; Chemistry; Civil and Environmental Engineering; Industrial Engineering; Biochemistry, Cellular, and Molecular Biology; Statistics; and Education.

The Program consists of four integrated components: [1] major research efforts with emphases on the environmental/mechanical synergistic interactions that often control materials lifetimes, [2] a new Ph.D. curriculum featuring integrative courses, [3] industrial and national-laboratory internships, and a student-exchange program among the universities, and [4] advanced, computer-based education/research technologies.

A major outcome of the Program will be Ph.D. graduates with a unique education/research background who can assume leadership roles in the solutions of complex technological problems involving *materials lifetime science and engineering*, resulting in accurate lifetime predictions and significant lifetime extensions of aging structural materials and components, and the development of new materials with improved lifetimes.

Undergraduate students, in preparation for graduate studies, may participate in the research activities of this NSF IGERT Program.

Call for Graduate Students

Graduate students (US citizens or permanent residents) will have unique opportunities to:

- Earn a Ph.D. at The University of Tennessee, Lehigh University, or Rutgers University in a new, integrated, multidisciplinary curriculum emphasizing *materials lifetime science and engineering*;
- Participate in a novel student-exchange program, spending a semester at one of the non-home universities;
- Receive on-site industrial case-study and research training through an industrial internship at the Engineering Technology Center -- a well-established consulting company specializing in developing advanced computational/design tools for structural-integrity analyses, at the Boeing Company -- a leading aircraft company with expertise in aging aircraft materials, at the General Electric Company -- a large, diversified company with world-class gas-turbine and jet-engine technologies, or at Haynes International -- a prominent superalloy company with vast knowledge in aging superalloys;
- Receive an internship at the Oak Ridge National Laboratory;
- Experience the most advanced, computer-based teaching methods, including the use of multimedia educational tools, tele-education/research training methods, and Web-based electronic notebooks;
- Utilize *state-of-the-art* research equipment and computational facilities at the universities and industries, and at Oak Ridge National Laboratory -- a world-renowned national laboratory;
- Receive integrated course work and research training aimed at developing mathematical models to predict more accurately the lifetimes of existing materials used in critical applications, such as aircraft structures, jet engines, steam generators and turbines, bridges, and surgical implant devices;
- Receive integrated course work and research training aimed at developing new materials with longer lifetimes;
- Study conventional materials, such as steels and aluminum alloys, and advanced materials, such as composites, superalloys, intermetallics, metallic glasses, biomedical materials, and nanostructural materials; and
- Graduate with a unique Ph.D. and exceptionally diverse, graduate-school experiences, resulting in high-demand employment in this exciting field.

For both graduate and undergraduate students who are interested in this program, Please contact:

Dr. Peter Liaw (865-974-6356, pliaw@utk.edu)
Dr. Ray Buchanan (865-974-4858, rab1@utk.edu)
Dept. of Materials Science & Engineering
The University of Tennessee, Knoxville, TN 37996-2200
See our Web site:
www.engr.utk.edu/mse/research/nsf-igert.htm

ASM International Foundation

Elected to 2001 Associations Advance America Honor Roll

MATERIALS PARK, OHIO (March 19) – The ASM International Foundation has been elected to the 2001 Associations Advance America Honor Roll, a national awards competition sponsored by the American Society of Association Executives (ASAE), Washington, D.C.

ASM International Foundation received the award for its **Materials CampSM**, a program introduced in partnership with the Materials Engineering Institute of ASM International to motivate high school juniors and seniors to consider a career in materials science. In its first year, Materials Camp hosted 30 students from the United States and Canada for an intensive, hands-on, five-day lab-based exploration, which was held at ASM's \$3 million Materials Engineering Institute training center in Materials Park, Ohio. This year the ASM International Foundation is expanding the program to include two camps, one at Materials Park and the other at the University of Washington in Seattle, Wash.

Very few high schools in the United States expose students to the many career opportunities in the fields of materials science and engineering. Through Materials CampSM, talented young people are able to learn from established professionals, perform experiments on up-to-date lab equipment, and discover topics they may pursue further in college. And since the ASM International Foundation covers all the students' expenses, family income does not prevent participation.

"The ASM International Foundation's program truly embodies the spirit of the Associations Advance America campaign. It is an honor and an inspiration to showcase this activity as an example of the many contributions associations are making to advance American society," remarked ASAE President Michael S. Olson, CAE.

May 15, 2001 Atlanta ASM Meeting Dr. Peter K. Liaw Speaks on NDT & Fatigue

The speaker for the May 15 meeting of the Atlanta Chapter of ASM is Dr. Peter K. Liaw of the University of Tennessee, Dept. of Materials Science & Engineering. He will speak on the topic: "**Nondestructive Thermographic Detection of Fatigue Damage: Experiments and Theoretical Modeling**". He is an ASM-International Fellow. Dr. Liaw has been working in the areas of fatigue, fracture, nondestructive evaluation, and life prediction methodologies of structural alloys and composites. Since joining UT, his research interests include mechanical behavior, nondestructive evaluation, biomaterials, and processing of high-temperature alloys and ceramic matrix composites and coatings. He has published over three hundred and fifty papers, edited sixteen books, and presented numerous invited talks at various national and international conferences.

Nominations for ASM Chapter Officers

Time is almost past for making your suggestions for next year's Chapter officers to the Nominating Committee. Elections will take place at the May meeting, where one might make nominations from the floor. However, you are required by the Bylaws to be sure that the person you nominate is willing to actually serve. The Nominating Committee is Chaired by **Prof. Naresh Thadhani** with members **Jim Hubbard** and **Bill Livesay**. The back page of this Newsletter gives you several ways to reach each of these nominating committee members. The strength and usefulness of your chapter is strongly affected by the leadership that you elect. If you have good ideas for a better chapter, put these ideas into action by suggesting for an office either yourself or others who will work & lead.

Atlanta ASM Chapter Officers

Chairman: John L. Mihelich, Metal Experts International, 7440 Mason Falls Drive, Winston, GA 30187, 770-942-7893V; 770-942-0922 F, yodonna@aol.com

1st Vice Chair: Kim B. Spinsby, Siemens Energy and Automation, 100 Technology Dr., Alpharetta, GA, 30005, 770-740-3185V; 770-740-3050F, kim.spinsby@sea.siemens.com

2nd Vice Chair: (Programs) George W. Kremer
1220 Lochshyre Way, Lawrenceville, GA 30043-6454
770-339-9938V; 770-339-6792F, gwkremer@bellsouth.net

Secretary: Gautam R. Patel, Georgia Tech Research Institute, Material Analysis Center
Baker, #273, Atlanta, Georgia 30332
404 894-3635V; gautam.patel@gtri.gatech.edu

Treasurer: James F. Lane, Applied Technical Services;
1190 Atlanta Industrial Drive, Marietta, GA 30066
770-218-2180 x3041V; 770-424-6415F, jlane@atslab.com

Atlanta Chapter Academic Advisor:
Ashok Saxena, Georgia Tech Mat. Eng. & Sci. Dept.,
Atlanta, GA 30332-0245
404-894-2888V; 404-894-9140 F, ashok.saxena@mse.gatech.edu
<http://www.mse.gatech.edu/faculty/saxena/sax.html>

Membership Committee Chair: Subu Shanmugham,
MicroCoating Technologies, 5315 Peachtree Industrial Blvd,
Chamblee, GA 30041
678-287-2417; subu@microcoating.com

GT ASM Student Chapter President: Ben Church,
Georgia Tech Student Chap President, Graduate Student,
Materials Science & Engineering, Atlanta, GA 30332-0245
404-894-9140; 404-894-5956F; gte443r@prism.gatech.edu

Communications & Web Site: Greg Kennedy,
Georgia Tech, Atlanta, GA 30332; 404-894-1475V; 404-894-9140F, gte290r@prism.gatech.edu

Immediate Past Chair: Naresh Thadhani,
Georgia Tech Mat. Eng. & Sci. Dept., Atlanta, GA 30332-0245;
404-894-2651V; 404-894-9140F,
naresh.thadhani@mse.gatech.edu
<http://www.mse.gatech.edu/faculty/thadhani/thad.html>

Previous Chairs Advisory Group: (Maximum of 3)
Bill Livesay, LSS, ASM Atlanta Newsletter Editor
775 Upper Hembree Road, Roswell, GA 30076
770-664-8742V; 770-410-0122F, b.livesay@gtri.gatech.edu

Jim Hubbard, Materials Analytical Services, 3945 Lakefield
Court, Suwanee, GA 30024
770-866-3205V, 770-866-3259F, jhubbard@mastest.com

Justin Clark, Past Student Chap. Pres. Georgia Tech Student
Chap President, Graduate Student, Materials Science &
Engineering, Atlanta, GA 30332-0245
404-894-5956V; 404-894-9140F, gt3360b@prism.gatech.edu

ASM-ATLANTA
775 Upper Hembree Road
Roswell, GA 30076