



# MATERIALS

## Materials Division Newsletter

Paul Joseph, Editor

Fall 2000

### Incoming Chair Message

I would like to thank Brian Cox for his leadership and service to the Materials Division, especially as its Chair over the last year. The Materials Division has grown strong and prominent in the ASME, with a large membership and a sound financial base. It has become the center of gravity for the presentation and development of interdisciplinary engineering education and research in our profession. Brian has articulated, simplified, and solidified the functions of the technical and the executive committee; these procedures will enable us to move forward to the next, and perhaps even more exciting era of interdisciplinary activities of the Materials Division. Let us all thank him for his energetic and thoughtful service to the Division.

The Materials Division now sponsors up to 50 sessions and approximately 10-15 symposia at the annual International Mechanical Engineering Congress and Exposition (IMECE). A majority of the Symposia are jointly sponsored with other Divisions, among them: Applied Mechanics, Fluids Engineering, Aerospace, Textile, Manufacturing, Electronic Packaging, Pressure Vessels and Piping. The symposia cover up to date, interdisciplinary topics. Consider for example, the plans of the Composites Committee for IMECE 2000 in Orlando: they include symposia on Multifunctional Materials (with emphasis on electronic packaging), Durability and Damage Tol-

erance of Composites (with emphasis on biomaterials), Design & Manufacturing of Composite (aerospace) and Design and Performance of Functional Biomaterials. Typically, the MD serves as the middle ground between Applied Mechanics and new applications of advanced materials. Two of these symposia will be published as special issues, one in the *ASME Journal of Engineering Materials and Technology* and the other in *Composite Structures*. This growing trend toward publishing papers presented in Symposia in refereed journals is most welcome: it assures high quality and wider circulation.

The *Journal of Engineering Materials and Technology* (JEMT) continues to flourish under the editorship of David McDowell. The limit for mandatory page charges has been expanded from six to nine pages, which should result in an increase of submission of high quality manuscripts. JEMT published two high quality special issues this past year, "Durability and Damage Tolerance of Heterogeneous Materials" in October 1999 (guest co-edited by Ann Marie Sastry, Robert C. Wetherhold, and Assimina A. Pelegri) and "Integration of Scientific and Engineering Aspects of Structural Materials in High Temperature Applications" in July 2000 (guest co-edited by Raj Mohan and Rishi Raj).

The Summer meetings, held biannually with the Applied Mechanics Division, continue the fine tradition among the two divisions. The leadership of the summer meetings now alternates between MD

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### Message from the Outgoing Chair



Brian Cox

What would Sisyphus think if he ever pushed his rock right over the top of that hill? Ah, to be an ex-chair!

But while committee work is hard labor and we naturally grumble while

we have to do it, yet now I can very easily say that my overwhelming sentiment about serving on the Executive Committee is what a pleasure it has been. Surely the first advantage of being involved in research and engineering is the opportunity of belonging to a world-wide community of friendly, interesting people. And many of my own professional friends, including many I had not met five years ago, are those who have served with me in the Materials Division. Thank you all for your companionship, positive attitudes, huge capacity for work, and happy spirits. The Society is performing its first and foremost function just through drawing together people like you.

The Materials Division continues to thrive. We have one of the best showings ever in symposia at this year's IMECE. Our Technical Committees are all in very able and willing hands, the *Journal* and

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## Incoming Chair Message

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and AMD; for example the next meeting, June 27-29, 2001, will be held in San Diego under the leadership of Sia Nemat Nasser. Enquiries should be sent directly to him.

The program committee Chair for IMECE-2001 is Dan Davis. The requests for Symposia are generally channeled to him via the Technical Committee Chairs who are listed in this Newsletter. However, please feel free to contact him directly as well if you have specific questions or suggestions.

Professor Fred Leckie is this year's Nadai Medalist. Many congratulations go to him for this well deserved, and prestigious award from the Materials Division of ASME. I will be serving as the Chair of the Nadai Committee in the coming year. The final nomination package to ASME is normally prepared by the Nadai Committee. Members are welcome to suggest names; these should be sent directly to me before December 1, 2000.

During the coming year I would like to focus on the idea of joint summer meetings with the new Divisions of ASME such as MEMS, Electronic Packaging and Biomaterials. The first such meeting can be planned for 2002 or 2004, the concept being that these meetings would alternate with the biannual meetings that are currently held jointly with AMD. I would like to begin by forming a small committee drawn from the membership of our own technical committees and those of our sister divisions. Suggestions are greatly welcomed and should please be sent directly to me.

I would like to thank the Technical Committees for growing the scope and quality of activities of the Materials Division through their ardent work. I also wish to thank Paul Joseph for his contribution as editor of this Newsletter, and extend a welcome to Mahyar Dadkhah as the new member of the Executive Committee of the Materials Division; he brings expertise in electronic materials to the committee. Many thanks also to Erwin Weinberg for serving as an effective interface between the Executive Committee and the Society's Headquarters.

*In closing I would like to remind all our members that the birth of new ideas, and their execution centers within the Technical Committees. The committees can thrive only by drawing new people into their fold. I strongly urge anyone interested in serving the Division (and ASME) to participate in the meetings of the Technical Committees. These meetings are open to all, and their schedule is published in the program. Also please feel free to contact me directly if you think that I can be of service. I can be reached at [rishi.raj@colorado.edu](mailto:rishi.raj@colorado.edu).*

*Rishi Raj*

## Outgoing Chair Message

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newsletter are top rank, and the Executive Committee has just the right mix of energetic people from industry, academia, and government. To all, thank you for your marvellous work. To the continuing members of the EC, Rishi Raj, Sue Cunningham, Bill Curtin, Dan Davis, and Mahyar Dadkhah, and to those who were on the committee with me in prior years, Vijay Stokes, Al Freed, Subra Suresh, Sia Nemat-Nasser, and Ted Nicholas, I extend sincere thanks for your friendship.

*Brian Cox*

## 2000 Nadai Medal Award Lecture



*Fred Leckie*

field of engineering materials." The medal takes its name from Arpad L. Nadai, one of the pioneers in the field of materials engineering, who contributed particularly in the areas of plasticity, fatigue, and high temperature behaviour. The Nadai Medal was established as the Nadai Award in 1975 and elevated to Medal status in 1998, after the establishment of a significant endowment fund for its support. This year's Medal has been awarded to Professor Frederick A. Leckie, Professor Emeritus in the Department of Mechanical and Environmental Engineering, University of California, Santa Barbara.

According to the Committee's formal citation, Fred Leckie has won the Nadai Medal for his "outstanding contributions as a scholar, teacher, and engineer to our understanding of materials and for his remarkable talent for exposing the simple essence of complex phenomena."

Fred has indeed made major contributions to both the fields of materials and engineering over a long career. He championed the development of constitutive laws that capture the essence of complex materials behavior in such a simple way that practicing designers can design with the materials easily and confidently. His development of the concept of the reference stress and the method of shakedown analysis for high temperature behavior

revolutionized the design and application of high temperature materials. His studies of creep rupture are among the foundations of our understanding and utilization of high temperature alloys. These and other of Fred's achievements have greatly facilitated the acceptance of advanced materials into engineering applications.

Fred was born in Dundee, Scotland. He gained a B. Sc. degree with First Class Honours in Engineering and was the Engineering Medalist at the University of St. Andrews in 1949. He then emigrated to take up positions first with a consulting engineering firm in London and then in military service in the Royal Air Force, where he held the distinction of being the Sword of Honour O.C.T.U. Staff Officer. He next moved to the U.S. and earned M. S. and Ph. D. degrees in Civil Engineering at Stanford University in 1955 and 1958. His thesis was entitled "Bending Theory for Shells of Revolution Subjected to Non-Symmetric Edge Loads." In his early academic career, he successively held research and teaching posts at the Technische Hochschule, Hanover, and the University of Cambridge, where he was a Fellow of Pembroke College, the Director of Studies in Mechanical Sciences, and a colleague of Arpad Nadai's. For the next decade, Fred was the Professor of Engineering at the University of Leicester; for the decade after that, Professor and Department Head at the University of Illinois; and for more than a decade since then, Professor and Department Chair at the University of California, Santa Barbara.

Prior recognition of Fred Leckie's contributions include the distinguished Haliburton Award of the University of Illinois and an Honorary D. Sc. conferred by the University of Leicester. He is a Fellow of the American Academy of Mechanics and of ASME. His public service record includes stints with the Department of Energy, Nuclear Inspectorate; the U.K Atomic Energy Authority; Euratom; the U.S. Army Corps of Engineers; the Pressure Vessel Research council; and numerous committees of NSF. He has served on the editorial boards of half a dozen prominent journals.

Fred Leckie has published several textbooks, book chapters, and edited books. His text "Matrix Methods in Elastomechanics" (with Pestel) is a standard in the field and still in use nearly 40 years after its first publication. He has published over 150 journal articles.

Professor Leckie will deliver the Nadai Lecture at the Orlando IMECE on Tuesday, November 7 at 5:30 p.m. His topic will be "Ceramic Matrix Composites Plasticity and Constrained Cracking."

# ASME *Journal of Engineering Materials and Technology*

The *Journal* continues to develop an increasingly prominent role as a leading source of high quality research papers in the various branches of materials engineering, including constitutive models for behavior, materials processing, environmental effects, failure analysis, fatigue and fracture mechanics, creep, friction and wear, lifetime prediction, structure-property relationships, and test procedures. The audience includes university, government and industry researchers and practitioners engaged in design, materials selection, structural analysis, materials processing and failure analysis.

The *Journal* emphasizes broad coverage of the interface between experimental characterization and state-of-the-art modeling of the processing and behavior of engineering materials, including constitutive equation development for deformation, fracture and fatigue and process/structure/property relations. The focus is on real materials and their structure, including experimentally observed behaviors and models that address pertinent issues. Papers focusing on either pure analysis or pure experiment, taken by themselves, rarely offer a glimpse into the underlying complexity of real materials and processes that are crucial to the mission of JEMT.

Our strategy continues to focus on maintaining and enhancing timely, high quality reviews and publishing special lectures and special issues of the *Journal*. These special issues typically emerge from symposia or workshops that enhance the development of new directions in research and development. We have sought to solicit and publish high quality special issues of the *Journal* to enhance quality and to reach page allotments. To this end, we are proud of two extremely high quality special issues that have appeared this past year. The October 1999 issue on "Durability and Damage Tolerance of Heterogeneous Materials" (154 pages), based on papers presented at the Fall 1998 ASME ICEME meeting in Anaheim, was guest co-edited by Professors Ann Marie Sastry, Robert C. Wetherhold, and Assimina A. Pelegri. The July 2000 Special Issue on "Integration of Scientific and Engineering Aspects of Structural Materials in High Temperature Applications" was ably guest co-edited by Dr. Raj Mohan and Professor Rishi Raj. A special issue on "Durability and Damage Tolerance of Composite Materials and Structures" is scheduled to

appear in October 2000; it is based on the Fall 1999 ASME ICEME meeting in Nashville. Guest co-editors include Professors A. Pelegri, W. Chan, A. Haque, M. Hosur, and S. Narayanaswamy.

From July 1, 1998 to December 30, 1999, the *Journal* received 171 papers. Of these, 75 have been accepted for publication, with another 40 still in the review process. The annual page allocation presently stands at 590 pages per year. Over the past few years, the average waiting time for a paper has been about nine months. The increase to nine pages without mandatory page charges has substantially enhanced prospects for submission of more high quality manuscripts.

Responsive and technically well-respected Associate Editors are instrumental in advancing the quality of any journal. To this end, we are grateful to Dr. Kwai Chan of Southwest Research Institute and Professors Huseyin Sehitoglu of the University of Illinois, Subhendu Datta of the University of Colorado, and Woody Ju of UCLA, whose second terms as Associate Editors expire this year. G. Ravichandran of Caltech has stepped down to address other administrative responsibilities. These gentlemen have contributed enormously to the development of JEMT over the past six years. Second three-year terms were approved in July 2000 for Professors Namas Chandra of Florida State

University and Hussein Zbib of Washington State University. Nominations of Professors Ann Marie Sastry of the University of Michigan and Golam Newaz of Wayne State University to join the editorial board were approved in July 2000. We welcome them as new Associate Editors.

Other current Associate Editors include Romesh Batra of Virginia Tech, Shaker Meguid of the University of Toronto, L. Cate Brinson of Northwestern University, Ewald Werner of the Technical University of Munich, Esteban Busso of the Imperial College in London, Didier Marquis of Ecole Normale Supérieure de Cachan, George Johnson of the University of California-Berkeley, Arunachalam Rajendran of the Army Research Office, and Shankar Mall of the Air Force Institute of Technology.

Finally, I would like to take this opportunity to invite readers of the *Journal* to submit their papers for publication, and to thank both the Materials Division and its Executive Committee for their continued support. I especially thank Connie Monahan at ASME and Cecelia Jones of Georgia Tech for their professional, efficient performance in assisting the *Journal* through its various phases of publication this past year.

D.L. McDowell,  
Regents' Professor, Georgia Tech  
Technical Editor, ASME JEMT

## Schedule of Materials Division Events at the Orlando IMECE 00

### Nadai Lecture

Professor Fred Leckie  
Tuesday, November 7, 5:45 p.m.

### Materials Division Banquet

Tuesday, November 7, 7:30-10:00 p.m.  
After-Dinner Speakers: Mr. Randy Bevan and Mr. Ken Sargent

### Committee Meetings:

Monday, November 6  
Polymers, 4:00-5:00 p.m.  
Materials Processing, 3:00-4:00 p.m.  
Ceramics, 2:00-3:00 p.m.

Tuesday, November 7  
MD Executive Committee (Closed Session), 1:30-5:00 p.m.

Wednesday, November 8  
Composites, 9:30-10:30 a.m.  
AMD-MD Joint Committee on Constitutive Equations, 4:00-5:00 p.m.  
Metals, 11:15-12:15 a.m/p.m.  
Electronic Materials, 11:15-12:15 a.m/p.m.  
MD Executive Committee (Open Session), 1:30-5:00 p.m.

## The Materials Division Web Site

The web site for the Materials Division is located at [www.engin.brown.edu/asme/mdwebpage](http://www.engin.brown.edu/asme/mdwebpage). The site is also accessible from [www.asme.org](http://www.asme.org). Members are encouraged to contact the web editor, Prof. Bill Curtin of Brown University, if they have pertinent information for posting.

## After Dinner Speakers: Randy Bevan and Ken Sargent



Randy Bevan



Ken Sargent

Mr. Randy Bevan, with the support of Mr. Ken Sargent, will be the after-dinner speaker at the Materials Division Banquet at the Orlando IMECE 00. He will present a talk entitled "Engineering the Magic - Materials Engineering at Walt Disney World Resort (WDW)". Bevan and Sargent have provided the following overview of their presentation: "We discuss the engineering challenges for Walt Dis-

ney World Co, as it pertains to the selection, processing, analysis, and testing of materials for use in a vacation/entertainment environment. Our "product" is entertaining our guests not only with physical items - rides, shows, architecture, horticulture, resorts, restaurants, and clubs, but intangible items as well such as service, safety, and efficiency. The materials engineering "mission" at Disney is to help develop the props our fellow 60,000+ cast members use to provide "the show" our guests experience. Materials engineering is used to ensure this expectation in a sometimes creative and innovative fashion. An added challenge is the artistic demand of an entertainment company. What is required is a "medium" for the artist to work with. This medium then is extremely broad - concrete mixes for fake stonework, PVC plastisols for animation, composites for ride vehicles, plastics for faux wood benches, fabrics for costuming, and a long list of other specialty items."

Mr. Bevan is the Manager of Applied Technology, Research and Development, at Walt Disney World in Orlando. He holds a B.S. degree in Industrial Engineering from Ohio State University and an MBA from Xavier University. Randy has been with Disney since 1988 and has worked with almost every operating segment of WDW to use a disciplined, scientific, approach to manage and solve problems with new technology. Many business issues presented to Randy have been resolved with the use of materials and process engineering. Randy's experience

outside Disney was as a plant manager for the printed circuit board industry.

Mr. Sargent is a Senior Materials Engineer, Applied Technology at Walt Disney World in Orlando. He earned a B.S. degree in Materials Science and Engineering from the University of Florida. Ken has been with Disney since 1993 and is the only degreed materials engineer on cast. Ken coordinates with over 1,000 Disney Architects, Engineers, Artists,

Designers, and Craftsman for a majority of new projects, as well as the up-keep, operation, and restoration of all WDW assets. Ken also works with outside material suppliers/consultants to develop new materials and manufacturing processes. Prior to Disney, Ken was a consultant working throughout the Southeastern U.S. with heavy emphasis on the amusement parks industry.

## Materials Division Technical Program for IMECE 00 in Orlando

The Materials Division's Technical Committees and members have put together an outstanding and broad technical program for the IMECE 00, to be held in Orlando, Florida from November 5-10, 2000. The Division is sponsoring 46 sessions at the Congress, with many of the Symposia being jointly sponsored with other ASME Divisions. Some of the traditionally strongly participating Technical Committees (TC) are again well-represented. The Composites TC is sponsoring a Symposium on Design and Manufacturing of Composite Structures and another on Durability and Damage Tolerance, while the Polymers TC is sponsoring a Symposium on Porous, Cellular, and Microcellular Materials. There are also several new and exciting Symposia aimed toward both technology and key emerging areas of materials research. From the Polymers TC, there will be a Symposium on Computer-Aided Engineering and Related Innovations in Polymer Processing consisting of six sessions. From the Electronic Materials TC, there will be a Symposium on Materials for Better Micro Devices consisting of six sessions. The Metals TC and Composites TC are jointly sponsoring a Symposium on Functional Biomaterials with three sessions, while the Composites TC is sponsoring a Symposium on Multifunctional Composites. A complete list of the Symposia is provided below. With a strong effort by our symposium organizers, many of the planned Symposia involve considerable participation from industrial scientists and engineers, making the '00 Congress an attractive meeting for all of our Division members.

The complete array of Symposia for IMECE 00 and their organizers, listed under the lead Technical Committees, are as follows:

### Composites (Chair: Robert Wetherhold)

- Durability and Damage Tolerance (A. Sastry), joint with AMD
- Design and Manufacturing of Composite Structures (S. Abrate)
- Multifunctional Composites (N. Sottos), joint with AMD

### Polymers (Chair: Vipin Kumar)

- CAE and Related Innovations in Polymer Processing (T. Turng, H. Wang)
- Porous, Cellular, and Microcellular Materials (V. Kumar)

### Electronics (Chair: Zhigang Suo)

- Mechanics and Materials for Better Micro Devices (Z. Suo, B. Cox, M. Dadkhah)

### Metals (Chair: Wolé Soboyejo)

- Durable Surfaces (D. Mumm, D. Popoola, M. Walters)
- Probabilistic Methods in Fatigue and Fracture (A. Soboyejo, W. Soboyejo, W. Orisamololu)
- Functional Biomaterials (N. Katsube, W. Soboyejo)

### Ceramics (Chair: Herman Nied) and Materials Processing (Chair: John Coulter)

- Processing and Design of Multi-component Materials Systems (M. Erdal, M. Altan)
- Microstructure and Mechanical Property Relationships (I. Beyerslein, S. Phoenix, Y. Zhu)

### Constitutive Equations (Chair: Martin Ostoja)

- Plasticity at Small Length Scales (C. Basaran), joint with AMD
- Recent Advance in Mechanics of Structured Continua (M. Massouidi, K. Rajagopal), joint with AMD

2000 Program Chair, Bill Curtin

# News from the Technical Committees

## AMD-MD Joint Committee on Constitutive Equations

This committee is the focal group at ASME promoting the state of the art and science of Applied Mechanics and Materials in the area of modeling the mechanical and physical behavior of materials and structures. First, a formal note: in the summer 1999, Hussein Zhib (Washington State University) has begun as Vice-Chair/Secretary of the committee. He has thus replaced George Z. Voyiadjis (Louisiana State University). We thank George for the service to our committee as Chair and Vice-Chair/Secretary over the past three years!

At the IMECE 1999 congress (Nashville, TN) the committee sponsored a Symposium on "Physical Modeling of Dynamic Failure Processes". It was organized by T.W. Wright, A.M. Rajendran and M. Zikry. At the ASME Summer 1999 Mechanics-and-Materials Conference (Virginia Tech, Blacksburg, VA) a Symposium on "Mechanics of Cellulosic Materials" was run by Hank Haslach, George Kyanka, M.K. Ramasubramanian and Richard Perkins. The proceedings came out as the AMD-Vol. 231 and MD-Vol. 85, 1999.

The committee members continue to be active at organizing new symposia. For the IMECE 2000 congress (Orlando, FL) three symposia are being planned: Symposium on "Recent Advances in Structured Continua" by M. Massoudi and K. Rajagopal; Symposium on "Recent trends in constitutive modeling of advanced materials" by M. Khraisheh and K. Willam; Symposium on "Plasticity at small scales for emerging technologies" by C. Basaran.

Also, several related activities are being organized by our members. For this and other information about the committee you are welcome to visit <http://www.asme.org/divisions/amd/constit.html>.

*Martin Ostoja-Starzewski, Chair*

## Ceramics Committee

The Ceramics Committee exists to promote all aspects of the advancement of engineering and science related to ceramic materials. This includes sponsoring symposia at major ASME conferences such as the annual ASME summer conference and the ASME IMECE held in November. For example, at the 2000 IMECE that will be held in Orlando, FL, the Ceramics Committee is sponsoring a symposium on "Structural Properties of Advanced, Novel Composites" and co-sponsoring a symposium on "Multi-component Materials Systems" (with the Materials Processing Committee). Plan-

ning for future Ceramics Committee sponsored symposia is currently underway. Two excellent opportunities for organizing a symposium sponsored by the Ceramics Committee currently exist: (1) 2001 Mechanics and Materials Summer Conference, June 27-29, 2001, University of California, San Diego, and (2) 2001 IMECE, November 11-16, 2001, New York, NY. If you are interested in organizing a symposium at either of these conferences please contact me as soon as possible for organizing details. The Ceramics Committee will meet in Orlando during this year's IMECE to review these plans and to solicit new symposium topics. Look for the room location in the final conference program. The Ceramics Committee invites all members to participate in these activities. If you are interested in organizing a ceramics related symposium or would like to participate as a co-organizer or session chair, you are encouraged to attend this meeting. Members interested in joining the Ceramics Committee should contact me directly, e-mail [hfn2@lehigh.edu](mailto:hfn2@lehigh.edu) or phone (610)-758-4128.

*Herman F. Nied, Chair*

## Composites Committee

The Materials Division Composites Committee works to represent the interests of ASME members who are active in composite materials, and to promote the technology of composite materials through technical conferences. The committee actively seeks members who have technical interests in the processing, manufacturing, and design of composites. The Committee has three "standard" themes around which IMECE symposia are organized: Design and Manufacturing, Durability and Damage Tolerance, and Smart/Multifunctional Materials. The emphasis and content of symposia varies from year to year, based on the interests of committee members. The Committee is interested in coordinating Symposia with other Committees, and is open to additional Symposia suggestions. Committee meetings are held during the IMECE and interested prospective members are invited to attend. The outgoing Committee Chair is Prof. Robert Wetherhold, Dept of Mech & Aero Eng'g, State University of NY, Buffalo [(716) 645-2593 x2241, [mecrcw@acsu.buffalo.edu](mailto:mecrcw@acsu.buffalo.edu)]; incoming Chair is Prof. Scott White, Dept of Aero & Astro Eng'g, Univ of Illinois at Urbana-Champaign [(217) 333-1077, [swhite@uiuc.edu](mailto:swhite@uiuc.edu)].

The Committee meeting held at the 1999 IMECE in Nashville was attended by 17 people. The 1999 Symposia were reviewed: Durability and Damage Tolerance of Composite Materials and Struc-

tures, organized by Assimina Pelegri, Wen Chan, Anwar Haque, Mahesh Hosur, and Sridhar Narayanaswamy; Design and Manufacturing, organized by Scott White and Ann Marie Sastry; Multifunctional Materials and Structures, Marty Dunn and Emmanuel Ayorinde (co-sponsored with Noise Control and Acoustics Division's Material Characterization Committee); and Applications of Porous Media Methods for Engineered Materials, Roy Sullivan. Papers from the Symposium on Design and Manufacturing will constitute a special issue of the Journal of Composite Materials. These symposia were highly successful in terms of technical content and attendance.

Plans are also underway to organize or participate in four symposia for the 2000 IMECE:

- Multifunctional Materials, N. Sottos of Univ. of Ill/U-C, A. Dasgupta of Univ. of MD, emphasis on electronics & packaging.
- Durability and Damage Tolerance of Composites, AM Sastry of Univ. of MI, Jianmin Qu of GA Tech., A Haque of Tuskegee; emphasis on biomaterials. Papers from the symposium will be submitted for a special issue of the Journal of Eng. Mat. and Tech.
- Design & Manufacturing of Composites, S Abrate of So. Ill Univ., Carbonale, S White, Univ. of Ill/U-C. Papers from the symposium will be submitted for a special issue of Composite Structures.
- Design and Performance of Functional Biomaterials, N Katsube, Ohio State Univ., W. Soboyejo, Princeton Univ.

Preliminary plans were made for several Symposia for the 2001 ASME IMECE. For more information on upcoming symposia, please contact the incoming chair, Scott White or attend the committee meeting at the Orlando IMECE at 9:30am on Wednesday, November 8, 2000.

*Robert Wetherhold, Chair*

## Electronic Materials

The rapid advances in microelectronics, optoelectronics, and micro-electro-mechanical systems (MEMS) post great challenges to mechanics and materials. How do quantum dots self-organize? How can devices be designed for longer life and be more compact? Questions are numerous, both scientific and practical. The field is wide open. Modern devices integrate diverse materials over many length scales. As the technologies advance, both materials and length scales change. In the last decade or so, quite a few academic scientists have begun to explore mechanical phenomena

in micro devices. Meanwhile, industrial scientists have been developing sophisticated methods to shorten design cycles. Both groups have felt large gaps in our understanding of small things.

The Electronic Materials Committee works to serve the ASME members active in the field. Minoru Taya, the Chair of the Committee for many years, has recently decided to step down. During his tenure, electronic materials have become a significant aspect of the MD. The MD Executive Committee has appointed Zhigang Suo to be the new Chair of the Electronic Materials Committee. At the Winter Meeting 2000, the Committee will sponsor a six-session symposium on "Mechanics and Materials for Better Micro Devices and Packages." The symposium aims to bring academic and industrial scientists together, and to link science to practice. The organizers are Zhigang Suo, Mahyar Dadkhah, and Brian Cox.

Several enthusiastic volunteers are planning symposia on materials issues in interconnects, ferroelectrics, MEMS, and quantum dots, to be held at the Summer Meeting at UCSD in 2001. Join us at the scheduled Committee Meeting in Orlando to plan activities, and to shape our future.

*Zhigang Suo, Chair*

## Material Processing Committee

During the past year, the Material Processing Committee continued to promote the development and dissemination of material processing technology through both internal and external efforts. At the November 1999 IMECE held in Nashville, the committee sponsored a symposium focused on an extremely important material processing issue, which is the "The Science, Automation, and Control of Processes Involving Coupled Material Transport and Rheology Changes." This symposium explored a rapidly developing field that encompasses intriguing and often highly coupled phenomena. The potential for improved material processing capabilities through a better understanding of coupled material transport and rheology changes is enormous. The symposium was very well received, and was made up of a number of invited and contributed papers from authors around the world. The proceedings of the symposium were published as ASME MD-Vol. 89. The committee greatly appreciates the efforts of Professor O. J. Ilegbusi of Northeastern University and Dr. G. O. Oyeleye of Trilog Communications, who together organized this successful symposium.

For the 2000 IMECE in Orlando, Florida, the committee is co-sponsoring a symposium on "The Processing and Properties of Multicomponent Materials." This

symposium is intended to focus on both fundamental science and industrial usage issues related to materials such as composites, filled polymers and ceramics, etc. The organizing committee for the symposium is made up of Professor O. J. Ilegbusi of Northeastern University, Professor Merve Erdal of the University of Minnesota, and Professor M. Cengiz Altan of the University of Oklahoma.

As far as planning for the 2001 IMECE is concerned, the committee has initiated the sponsorship of a large symposium to be co-sponsored by other committees. This symposium will focus on "Advances in Materials Processing Science" and will be organized by a committee of individuals led by Drs. Dennis Siginer (NJIT), John Coulter (Lehigh), and Ranga Pitchumani (Univ. of Connecticut). The intention of the materials processing committee is to assist with the hosting of such a large symposium on manufacturing science advancements every four years.

In addition, in recognition of the size and breadth of the material processing industry, the committee has formed a group of interested individuals representing a wide variety of disciplines, employers, and/or professional societies. The purpose of the group is to promote improved technological advancement and deployment in the material processing area by better integrating broadly applicable and inter-disciplinary developments. Persons interested in being involved in this activity are encouraged to contact Professor John Coulter [(610) 758-4503, john.coulter@lehigh.edu] or the current material processing committee Vice-Chairman, Professor Devdas Pai of North Carolina A&T State University [(336) 334-7620, ext. 316, pai@garfield.ncat.edu].

Those interested in any of the above mentioned activities, or in becoming a member of the material processing committee, are invited to attend the next committee meeting, which will be held at the upcoming Orlando IMECE on Monday, Nov. 6 at 3:00 p.m.

*John P. Coulter, Chair*

## Metallic Materials Committee

The metallic materials committee has been very active during the past year. As usual, a significant fraction of the committee's activities has involved the organization of symposia. Dr. Ted Nicholas (Wright Patterson Laboratorys, Wright Patterson Air Force Base) and Dr. Sandeep Muju (Honeywell) organized a highly successful symposium on the Fatigue and Fracture of Aerospace Materials. The symposium, which was co-organized with the Aerospace Materials Committee, was held at the ASME Winter Meeting that was held in Nashville, TN, last November.

Plans for symposia to be held at the 2000 IMECE in Orlando were made by the Metallic Materials Committee in Nashville. These symposia are:

- Symposium on Probabilistic Methods in Fatigue and Fracture (organized by Alfred Soboyejo, Wolé Orisamolu and Wolé Soboyejo)
- Symposium on Durable Surfaces (organized by Dan Mumm, Mark Walter, Oludele Popoola and Wolé Soboyejo)
- Symposium on Functional Biomaterials (organized by Noriko Katsube, Michael Sacks and Wolé Soboyejo)

Future activities for 2001 will include two symposia at the joint ASME/ASCE summer meeting in San Diego, CA in June of 2001. These include: a joint ASME/ASCE symposium, which will focus on Materials for Infrastructure (to be organized by Wolé Soboyejo, Dan Davis and Alfred Soboyejo) and a symposium on Processing and Performance of Cellular Metallic Structures (to be organized by Tianjian Lu, Anthony Evans and Wolé Soboyejo). One other symposium will be held at the IMECE in 2001. This will feature papers on the Fatigue and Fracture of Advanced Metallic Materials.

*Wolé Soboyejo, Chair*

## Polymer Committee

The Polymer Committee is organizing two symposia at the upcoming 2000 IMECE at Orlando, both of which have become a tradition. The first is a symposium on "Porous, Cellular and Microcellular Materials" that I have organized at the University of Washington. This symposium has been organized every two years since 1992. The second symposium, organized every three years since 1994, is on "CAE and Related Innovations for Polymer Processing", organized by Tom Turng of Cmolde, Inc., H.P. Wang of GE, and Karthik Ramani of Purdue. Both Symposia have industry participation.

I have now completed my three-year tenure as Chair of the Polymer Committee. As evident by this year's program, polymers now have a strong presence in the Materials Division. Although we all have to continue efforts to involve industry in ASME's technical programs, the polymers area has established a successful record in this regard.

The membership of the committee is open to all. The committee meets once a year at the IMECE. The primary purpose of this meeting is to plan future polymer related symposia. All interested are invited to attend our meeting at Orlando IMECE on Monday November 6, 2000, at 4:00 p.m.

Best wishes to Karthik Ramani of Purdue, who will be taking over as Chair of the committee at Orlando.

*Vipin Kumar, Chair*

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## Past Nadai Awardees

F. Leckie	2000	W. F. Brown, Jr.	1986
J. Hirth	1999	S. Yukawa	1985
A. Argon	1998	T. J. Dolan	1984
David L. McDowell	1997	A. J. McEvily, Jr.	1983
J. R. Rice	1996	I. Finnie	1982
N. D. Cristescu	1995	S. S. Manson	1981
O. Richmond	1994	M. M. Manjoine	1980
W. E. Sharpe, Jr.	1993	L. F. Coffin, Jr.	1979
G. J. Dvorak	1992	F. A. McClintock	1978
J. W. Hutchinson	1991	G. R. Irwin	1977
S. D. Antolovich	1990	E. A. Davis	1976
H. T. Corten	1988	G. M. Sinclair	1975
E. Krempl	1987		

## Past Materials Division Chairs

B. Cox	1999
T. Nicholas	1998
S. Nemat-Nasser	1997
S. Suresh	1996
A. D. Freed	1995
V. K. Stokes	1994
G. J. Weng	1993
M. Taya	1992
A. A. Tseng	1991
C. W. Merten	1990
R. M. Horn	1989
C. K. H. Dharan	1988
T. A. Auten	1987
J. R. Whitehead	1986
A. E. Carden	1985
J. E. Williams	1984
C. Niemczewski	1983
W. Owens	1982
W. A. Van Der Sluys	1981
J. P. Gallagher	1980
T. U. Marston	1979
A. Blelloch	1978
E. Krempl	1977
J. M. Kraft	1976
S. Yukawa	1975
D. K. Felbeck	1974
I. LeMay	1973
C. H. Wells	1972
J. H. Thompson	1971
A. J. McEvily, Jr.	1970
R. M. Goldhoff	1969
A. Rubio	1968
G. M. Sinclair	1967
T. W. Eichelberger	1966
I. Finnie	1965
H. R. Voohees	1964
M. E. Shank	1963
H. T. Corten	1962
L. W. Smith	1961
W. E. Cooper	1960
M. J. Manjoine	1959
W. E. Trumpler	1958
J. B. Rutherford	1957
J. O. Smith	1956
W. L. Fleischmann	1955
R. G. Sturm	1954

## Materials Division Fellows

**July 1999 to December 2000**

Stephen D. Antolovich  
Yasuhide Asada  
Stephen W. Attaway  
Bilal M. Ayyub  
Maciej P. Bieniek  
James W. Coaker  
Isaac M. Daniel  
Arturo J. Egli  
Mohamed S. El-Genk  
Alan D. Freed  
James D. Gardner  
Selcuk I. Guceri  
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Yong-Taek Im  
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Erich F. Klementich  
Kyriakos Komvopoulos  
Dimitris C. Lagoudas  
Victor C. Li  
Stephen Liu  
Giulio C. Maier  
Javad T. Mostaghimi  
Robert N. Pangborn  
Yusef R. Rashid  
Guruswami Ravichandran  
Sunil Saigal  
Ting-Leung Sham  
Wei Shyy  
Maonhar S. Sohal  
William J. Stronge  
Stephen R. Swanson  
Hamid Torab  
Robert D. Tzou  
Elmar Upitis  
Steven W. Van Sciver  
Anthony M. Waas  
Y. Jack Weitsman  
Joseph Zarka