Fall 2004

APPLIED MECHANICS

Editor: Kenneth Liechti

Report of the Chair

P.D. Spanos, Chair ASME/AMD 2003–04

Maintaining the tradition of the past, I provide a report on the affairs of the Applied Mechanics Division (AMD) for the period July 1, 2003 - June 30, 2004. Note that with the advent of information technology, letters of several past Chairs of the division are available on the site of our division. In this context, I apologize for the unavoidable, yet hopefully limited, repetition of styles.

Four years ago when I was invited to join the Executive Committee (EC), I was pleased to know that I would join a distinguished group of engineers and scholars, and my expectations have been fulfilled in every respect. I have been fortunate to work quite productively with Tom Hughes, Stelios Kryiakides, W. K. Liu, Mary Boyce, and Tom Farris.

The responsibilities of the Chair of the division during his/her tenure are multifaceted. First, the Chair must ensure that the division is represented vigorously at the Winter Annual Congress of ASME and in the summer meetings, both nationally and internationally, that are organized or sponsored by AMD.

Second, the Chair is responsible for collecting the nominations, hopefully timely and well documented, for consideration by the selection committees of the Timoshenko Medal, the Koiter Medal, the Drucker Medal, the Applied Mechanics Award, and the Junior Applied Mechanics Award.

Third, in a close cooperation with the Technical Editor of the *Journal of Applied Mechanics* (JAM), the Chair is responsible for the well-being of this precious asset of our division.

Finally, the Chair has the stewardship of the finances of the division, and it is from this perspective that I wish to share pertinent information with the AMD membership.

Professor W. Liu did an excellent job with the technical program in the 2003 ASME International Mechanical Engineering Conference which was held on November 16 through 21, 2003 in Washington, DC. Thanks are due to all of the technical committees of the division that worked diligently for this program. For the 2004 Congress, Professor Tom Farris is the AMD representative, and it is my understanding that the organization of the program progresses smoothly.

Dr. Pol Spanos (left) presents the Koiter Medal to David R. J. Owen at IMECE 2003.

The summer technical meeting of our division was held in Scottsdale, Arizona. Professor Marc Mignolet of The Arizona State University at Tempe and the rest of the organ-izers deserve our thanks for putting the meeting together despite some adverse initial conditions.

There will not be a summer meeting of our division this year because of the World Congress on Theoretical and Applied Mechanics which will be held in Warsaw, Poland from August 15 to August 21, 2004. Stelios Kyriakides has worked as the representative of ASME diligently on this matter and has helped the US Committee on Theoretical and Applied Mechanics with the review of the papers that have been submitted for consideration for the program of this Congress.

For the year 2003-2004, our division was blessed with a set of outstanding recipients of the medals and awards which are under its stewardship. The Young Investigator Award was awarded to Cate Brinson of Northwestern University for her contributions to the area of polymer composites and shape memory alloys. The AMD Award was awarded to John Hallquist of Livermore Software Technical Corporation for his pioneering developments of explicit nonlinear finite element methods and their worldwide dissemination in the DYNA programs. The Drucker Medal was awarded to Leon M. Keer of Northwestern University in recognition of novel solutions of the equations of elasticity, creative methods of analysis of contact and fracture, and mentorship of numerous research students and colleagues. The Koiter Medal was awarded to David R. J. Owen of the University of Wales (UK) for his contributions to the field of theoretical and computational solid mechanics and finite element applications to the solutions of Cosserat Continua. Finally, the Timoshenko Medal was awarded to L. B. Freund of Brown University in recognition of his seminal contributions to the mechanics of dynamic fracture, seismology, and the mechanical behavior of thin films. Following a long-lasting tradition, Professor Freund's presentation during the Applied Mechanics Banquet held in Washington, DC on November 17, 2003 is included in this newsletter.

I am happy to announce that through vigorous initiatives and intense scrutiny, the 2003 – 2004 committees for selecting the recipients of the various medals and awards of the division have done a great job, and I am proud to have served as the Chair of these committees for this year. The recipient of the Young Investigator Award is Professor K. Bhattacharya of The California Institute of Technology. The recipient of the AMD

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Report of the Chair

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Award is Professor Arthur Leissa of The Ohio State University. The recipient of the Drucker Medal is Professor F. McClintock of The Massachusetts Institute of Technology. The recipient of the Koiter Medal is Professor Z. Mróz of The Institute of Fundamental Technological Research in Poland. Lastly, the recipient of the Timoshenko Medal is Professor Morton E. Gurtin of Carnegie Mellon University. All of these recipients will be recognized in the annual Applied Mechanics Banquet during the 2004 Congress in Anaheim, California on November 18, 2004.

I want to express deep appreciation to all the members of the selection committees and the nominators for these prestigious awards of our division. It is of paramount importance for the committees to receive outstanding nominations. For this year the incoming Chair of the division will be responsible for coordinating the nomination process. **Please forward a complete resume of the nominee supported by at least four letters of recommendation by September 30, 2004 to Professor M. Boyce, Chair, ASME AMD 2004-2005 1-304, Mechanical Engineering Massachusetts Institute of Technology 77 Massachusetts Avenue Cambridge, MA 02139 e-mail: mcboyce@mit.edu.**

The *Journal of Applied Mechanics* (JAM) of ASME, which is under the stewardship of the Applied Mechanics Division enjoys the enlightened editorship of Professor Bob McMeeking of the University of California of Santa Barbara. Bob has been quite sedulous with the affairs of the journal which rests well among the set of the premiere journals of ASME. He has convinced a set of outstanding individuals with widespread thematic interests to serve as Associate Editors of the journal. My personal experience is that, on a global scale, the JAM is one of the most effective journals for disseminating research findings as well as being widely read and respected. Thus, I urge all the members of the division to continue using this journal for publicizing their scholarly work. On this occasion, I want to express my personal thanks to Bob and to the immediate past, current, and incoming Associate Editors of the JAM for their unselfish work and meticulous contributions.

The division benefited to a great degree from the services of Professor Carl Herakovich who served as the liaison between the AMD Executive Committee and the ASME administrative echelon. Over a period of years, the Executive Committee sent a consistent message to ASME regarding the fair demand of receiving some portion from the income that is produced by the technical activities and the publication of the JAM. This is an ongoing matter and some initial success has been achieved. I am glad to note that past Chairs and all the members of the current Executive Committee have been sensitized to this delicate issue. I personally thank everybody who has helped, and in particular Carl Herakovich and Stelios Kyriakides for their relentless pursuit of an agreeable solution.

My term of service with the Executive Committee and as the Chair of the Division ended on June 30, 2004. Effective July 1, 2004 Dan Inman of the Virginia Polytechnic Institute will join the Executive Committee as a new member. Dan, welcome! My replacement as the new Chair of the division is Professor Mary Boyce of The Massachusetts Institute of Technology. I am quite confident that Mary with her inclusive but, nonetheless, no-nonsense demeanor will serve the interests of the Division quite effectively.

This year I have interacted numerous times with Edison Aulestia and his assistant, Carol Griffin, who are our liaisons with the ASME headquarters. I thank them very much for their responsiveness, delightful stochasticity, graciousness, and sense of humor.

Finally, I leave the affairs of the division in not only the hands of Mary Boyce, but also of W. Liu, Tom Farris, K. Ravi-Chandar, and Dan Inman. This is a powerhouse of distinguished, effective, responsible, and vibrant individuals. The division will be served well!

In closing, I cannot resist including my perspective on the experience that I have had this year as the Chair of the division, and over a period of years as a mechanician. Mechanics remains a wonderful field of scientific endeavor that has attracted geniuses such as Archimedes, Galileo, Newton, and several others. In this context, during the deliberations of the committee for selecting the AMD Young Investigator Award it was quite heartening to see evidence that extremely talented and laborious young minds continue to be attracted to our profession. In the same context and in the committees' deliberations for the recipient selection of the senior medals, it became humbling and inspiring to discover the extreme degree of originality, dedication, and productivity reflected in the oeuvres of the nominees. Thus, Mechanics, despite the sporadically disconcerting fluctuations in the modes of operation and the foci of attention of various funding agencies and academic administrators, is robustly alive! Perhaps the most important prerequisite for a successful tenure in this beloved field is optimized thematic adaptivity, subject to the constraint of making thorough and relevant contributions. As a mechanics "guru" described it to me recently, "a successful mechanician knows exactly when to get 'unstuck' from a particular research area!"

I express my gratitude to all the members of the AMD for allowing me the honor and the pleasure of serving as its Chair for 2003-2004. •

The most exciting phrase to hear in science, the one that heralds new discoveries, is not 'Eureka!' but 'That's funny...'—Isaac Asimov

Awards

2003 Applied Mechanics Division Award

Presented to Dr. John O. Hallquist in recognition of his pioneering developments of explicit nonlinear finite element methods and their worldwide dissemination in the DYNA programs.

2003 Daniel C. Drucker Award

Presented to Professor Leon Keer in recognition of his development of novel solutions of the equations of elasticity, creative methods of analysis of contact and fracture and mentorship of numerous research students and colleagues.

2003 Koiter Medal

Presented to David R. J. Owen in recognition of his contributions to the field of theoretical and computational solid mechanics and finite element applications to the solutions of Cosserat Continua.

2003 Young Investigator Award

Presented to Cate Brinson in recognition of her distinguished contributions to the area of polymer composites and shape memory alloys.

2003 Timoshenko Medal

Presented to Professor L.B. Freund in recognition of his seminal contributions to the mechanics of dynamic fracture, seismology, and the mechanical behavior of thin films.

L.B. Freund

Reflections and Refractions

L. B. Freund, Division of Engineering, Brown University

Friends and colleagues, I've attended many Applied Mechanics Dinners over the years, but this one has been the most enjoyable so far. Hopefully, that view will survive the next 20 minutes or so.

It's a singular honor to receive the Timoshenko Medal of ASME. For one thing, it's deeply gratifying to get a pat on the back from one's peers. It's also a privilege to have one's name added to the list of previous recipients, which includes so many individuals for whom I have the deepest respect.

Stephen Timoshenko himself had withdrawn into retirement long before I discovered that I had an interest in his field, and I never encountered him in person. However, I do have something of a direct connection to Timoshenko, in that he is my academic great great great grandfather. The appearance of his advanced textbooks on mechanics was surely among the defining events for the field in the 20th century.

A few months ago, long before I had given any thought to this evening's remarks, I was asked to provide a title. It seemed safe enough to adopt the tone of Timoshenko's memoirs by choosing *Reflections and Refractions*, borrowing a couple of terms from wave propagation. The intention of the term Reflections in this context is self-evident. The term Refractions was added as a reminder, mainly to myself, that recollections can possibly become distorted when viewed through the medium of elapsed time. In any case, I intend to follow tradition by reflecting on aspects of my own experiences in the field, hopefully with no more refraction than my years will allow.

My pioneer ancestors had the foresight to settle in a place that would eventually establish a superb state university. I might mention that, when John Hutchinson first learned some years ago that I had been raised on a farm in rural Illinois, he suggested that perhaps I had overcompensated for it. Eventually, I enrolled at the University of Illinois to study electrical engineering. Inspired by a course on dynamics that was then required for electrical engineering, I changed my major to engineering mechanics at the end of my second year, whereupon Chuck Taylor became my academic adviser.

Throughout my undergraduate years, I worked all summers and holidays for a company that manufactured earthmoving equipment and airport towing tractors. My job was involved with field testing these machines, including for example the first towing tractor designed specifically for the Boeing 747, then on the drawing board. With an eye toward a more interesting job than I saw being done by engineers at this company, I continued on for a master's degree at Illinois. It was during this time that talented people such as Henry Langhaar and Marv Stippes opened my eyes to the rewards of an in-depth understanding of this stunningly beautiful subject we all deal with. To pursue that ideal for myself, it was off to Northwestern to continue graduate study.

Upon arrival in Evanston, Jan Achenbach became my research adviser, another of my many good fortunes. He proposed interesting topics for us to study, and he gave me the chance to work with a good deal of independence. This approach invariably leads to rewarding surprises in the learning process and it allows one to benefit even from mistakes or from false starts, of which there were plenty, and I've tried to follow the same approach with my own research students and postdocs. The knowledge gained in doing a thesis on diffraction of elastic waves turned out to be invaluable within just a few years. Of most significance, I think, was an appreciation of the awesome power of some fundamental theorems in analytic function theory that underlie the operational techniques in applied mathematics that we usually take for granted.

After Northwestern, it was off to Brown for a one-year post-doctoral fellowship. At a birthday symposium earlier this year, Jan Achenbach recalled thinking at the time that this was going to be another case of a promising young person being lost to plasticity. I did try my hand at plasticity but also found other interesting things to do. Eventually, I joined the regular faculty at Brown, and one year became many years.

In the early days, my usual path to the coffee room in the morning took me past Jim Rice's office on the seventh floor of our building. On a particular morning in 1970, he showed me a reprint that he had just received in the mail from Jock Eshelby. This paper dealt with dynamic mode III crack growth at nonuniform rates. To someone with experience in wave propagation, the results reported in the paper, particularly the appearance of sharp discontinuities on wavefronts in two dimensions, were astonishing. We wondered if it was possible that the same remarkable physical features could also arise in the more realistic case of tensile cracking. At the time, it seemed unlikely because of the existence of surface waves in the latter case.

Neither books nor courses on fracture mechanics yet existed, and I knew absolutely nothing about stress intensity factors or energy release rates. Nonetheless, the appeal of a new area trumped my ignorance of the lore of the subject, and I adopted this problem in crack dynamics as something of a mission. During the next year, there was no progress whatsoever concerning accelerating tensile cracks, although I did learn other things about crack dynamics. Finally, one afternoon while working alone at the blackboard in my office, the fog lifted and things came together. I can still picture in my mind the diagrams that were on the board.

The work was completed within the next few months and the key papers were submitted for publication. To this day, I remain indebted to my senior colleagues at Brown for having provided an atmosphere in which an assistant professor could devote a couple of years to a substantial project in this way, and have striven to provide a similar environment for other young people as they've come along. As an aside, I also came to know Eshelby a few years later, when he coupled a trip to the U.S. to receive his Timoshenko Medal with an extended stay with our group at Brown, which was a fascinating and entertaining few weeks for us.

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Reflections and Refractions

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A particular dynamic fracture phenomenon of interest in those days was the type of shear cracking that occurs in earthquakes. At about this time, seismologists were concluding that the dislocation based models that they had been using to describe faulting in the crust of the Earth were overly constrained. They were now looking for fully kinetic models in which neither driving force nor kinematic response was specified a priority. These shear crack models provided an ideal starting point for addressing the issue. This connection provided an opportunity for me to work for a number of years in a field quite different from my own. The people I came to know — seismologists and geophysicists - are a very talented group and it was a great pleasure to be included as an adopted member of that community for some years. The special focus they have on this one thing — the earth — took some getting used to. They are not inclined to think about ways to improve it, a natural tendency for engineering.

Another interesting set of issues for which dynamic fracture mechanics played a central role concerned structural safety and reliability. Perhaps the main issue of the day was arrest of running fractures in tough structural materials, reactor pressure vessels or ship hulls for example, accepting that crack initiation was inevitable. There was good progress on plasticity effects in dynamic fracture during this period in the course of productive collaborations with my students and postdoc, as well as with John Hutchinson and his students.

A related problem in which I became involved, initially on a consulting basis, was explosive rupture of long sections of natural gas transmission lines. Conventional wisdom held that the problem would vanish if one used pipeline steels that retained their ductility at high deformation rates. The reasoning was that, during rupture of a pressurized pipeline, the pressure release wave generated by escaping gas would always outrun a ductile crack and pipeline damage would be localized. However, nature doesn't always conform to conventional wisdom. Accidents in which miles of operating pipeline were ruptured explosively continued to occur. To try to understand how this could be so, a consortium of pipeline producing companies ran a series of dramatic full-scale tests on instrumented pipelines that confirmed field experience, and they wanted some assistance in interpreting the observations.

I mention this project mainly because it's an example of an important mechanics problem that is incredibly messy, involving large deformation, plastic flow, ductile fracture, inertial forces, gas dynamics, and possibly soil mechanics, one of the most mysterious of the practical arts. There are few clues on how to proceed with sorting it out. However, by means of some calculations based on overall power balance, done in collaboration with Dave Parks and Jim Rice, we were able to pin down the reason for the sustained long running ductile fractures and to identify strategies for implementing mechanical crack arresters. While such problems are rarely discussed in books or in the classroom, they represent some of the most pressing issues in our line of work. A key step to progress, it seems to me, is in identifying the appropriate level of detail for approaching the problem. The most refined level is not always the most appropriate. Perhaps this particular problem seems dated in the micro-nano era, but I believe that the point of view is scale invariant.

Some time in the mid 1980s, two small things happened that would have long-term ramifications for me. First, Cambridge University Press asked about my interest in writing a monograph on dynamic fracture. The preparation of such a book is a time-consuming and sometimes tedious task, as many of you know. However, the subject itself had developed in a sporadic way, typical of basic research. Writing a book offered the prospect of describing the whole journey through the subject as a continuous story, with the various stages of development put into perspective. The preparation of *Dynamic Fracture Mechanics* turned out to be among the most satisfying experiences of my professional life. A good deal of the credit for the fact that such a specialized book is still in print after all these years goes to condensed matter physicists who discovered the subject for themselves during the 1990s.

The second noteworthy turn of events was another step in the increasingly productive interaction between solid mechanics and materials science. Two colleagues at Brown had founded a company concerned with fabrication of photovoltaic solar cells. These are thin film semiconductor diode structures that combine the effect of excitation of electrons from their ground states by photon absorption with the conduction band offset properties of PN junctions to produce electric current from sunlight. Their films were peeling off the substrates and they wanted to know the reason, which was easy enough to explain.

More importantly, from the literature of the day it was clear that issues of stress driven degradation of material quality loomed as barriers to the advancement of a number of promising thin film technologies, even in cases in which load carrying capacity of the film material wasn't a design function; mechanics issues were literally showstoppers. Many interesting questions were identified that could be addressed by applying the principles of mechanics, possibly extended by coupling with thermodynamics, microstructural features or quantum mechanics. The appeal of this new area suggested it was time for another change in focus. As Yogi Berra advised, "When you come to a fork in the road, take it." Through this thin films research effort, I came to know a whole new group of very capable people working with semiconductor materials, including crystal growers, microscopists, and device engineers. After working in the area for a dozen years or so, and after teaching a graduate course on thin films several times at Brown, it seemed that there was a story to be told and another book was in order. Subra Suresh joined me in the project of writing *Thin Film Materials* which, we're happy to report, is now completed. This book writing experience has again been exceptionally rewarding, in large part due to Subra's good company.

So much for the past. What about the future for mechanics? In the course of my career, the field has been sustained largely by two major movements — the evolution of the numerical finite element approach as a core methodology and the central role of mechanics in quantifying material performance, the latter of which contributed to a welcome rejuvenation of experimental mechanics. It's interesting to speculate about emerging trends, although one wonders about the wisdom of doing so in front of a microphone. It's likely that mechanics applied to small-scale engineering materials and biomaterials will continue as a guiding beacon for some time. By relying on its very special perspectives — continuous field concepts, microstructurally informed constitutive modeling, quantitative analysis and experimentation, and emphasis on realistic boundary constraints — mechanics can continue to serve as a critical link between the basic sciences and engineering applications. To pursue opportunities, it's incumbent upon us to develop a certain depth of understanding about mechanics related questions in other

fields. I would agree that there is nothing as useful as a sound fundamental mechanics theory, but that utility can be appreciated only through demonstration. Someone has to care about the consequences.

It is important that we, as custodians of the discipline, sustain its core structure. To me, this means having a significant number of strong, vibrant graduate programs around the country that offer comprehensive educations spanning theory, computation and experiment. The detailed structure of such programs today differs markedly from those in my own student days, and it seems that we are in the early stages of another significant transition. In a decade, I expect that other issues, for example, thermodynamics, statistical mechanics and surface phenomena, will become more central than they are today.

In their Applied Mechanics Dinner lectures, both John Hutchinson last year and Ted Belytschko the year before emphasized the importance of cultivation of young people for the vitality of the field. Observing young people I've known thrive in their endeavors, and thereby become not-so-young leaders in the field, is always satisfying, and I certainly agree with the viewpoint. There are other aspects of our field on which I've formed views over the years — the role of the archival literature, for example — but I don't wish to overstay my welcome at the podium. Therefore, I'll conclude with a couple of acknowledgments.

A professional career is rarely a solitary endeavor, and that is surely so in my case. There are many people who have earned a portion of the recognition handed to me tonight. Most important among them are the members of my family who have given a deeper purpose to it all. In her own way, my wife Colleen has been a contributor to the field of mechanics since our days in Evanston; in addition, her sound character and good sense have often offset my own shortcomings.

I feel very fortunate to have been a member of this mechanics community over the years. The largely open, constructive and scholarly character of the community has been a sustaining strength, even though its cast of characters changes continuously. It's been my great privilege to have worked closely with many superb colleagues and students at Brown University for many years. When all is said and done, the real satisfaction of standing here tonight has been in the journey itself.

It's a great honor to be included in this ongoing tribute to Stephen Timoshenko. I'm very grateful to the Applied Mechanics Division executive committee and to all who have contributed anonymously to bringing this about. Clearly, these are all honorable people, in spite of the fact that they've exaggerated the truth so as to make this seem plausible.

In a recent PBS broadcast on Winston Churchill, it was reported that, when he set out to prepare his six-volume history of the second world war, he said, "History will be kind to me, for I shall write it." I am very grateful to have had the opportunity to write a bit of my own history here this evening. Thank you all for coming, and I wish you a good evening. •

Give me a lever long enough and a fulcrum on which to place it, and I shall move the world.—Archimedes

There is a single light of science, and to brighten it anywhere is to brighten it everywhere.—Isaac Asimov

News from the Technical Committees

Most committees maintain an open policy toward membership. Please contact the Committee chair if you wish to join or participate in the activities of the committee.

AMD-MD Joint Committee on Constitutive Equations

Hussein M. Zbib, Chair • zbib@wsu.edu

The Technical Joint Committee (TJC) on Constitutive Equations (CE) of the Applied Mechanics Division (AMD), and Materials Division (MD) of the American Society of Mechanical Engineers (ASME) exists to promote, support, and advance 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. The committee's interests cover the area broadly and include relevant physical phenomena, theoretical and mathematical problems, constitutive modeling issues, experimental aspects, numerical modeling, etc.

The committee usually holds its annual meeting during the regular ASME Congress with its last meeting at the IMECE 2003 in Washington, DC and presided over by Prof. Hussein M. Zbib (zbib@wsu.edu), the committee chairman. The committee welcomed three new members to its ranks: Dr. Y. Mikata, Knolls Atomic Power Lab, NY; Prof. T. Hassan, NCSU; and Prof. Sinisa Mesarovic, WSU.

The committee discussed proposed symposia for the forthcoming IMECE2004 and approved the five following proposals: 1) Symposium on Mechanics on the Nanoscale and Microscale, organized by Drs. Sinisa Mesarovic (Mesarovic@mme.wsu.edu), Ashraf F. Bastawros (bastaw@iastate.edu), Jeffrey W. Kysar (jk2079@columbia.edu), and Yozo Mikata, (ymikata@nycap.rr.com); 2) Symposium on Mechanics and Materials: In Honor of Professor Leon Keer's 70th Birthday, organized by Dr.s Minoru Taya, (tayam@u.washington.edu), Wing Kam Liu (w-liu@northwestern.edu), K.T. Chau (cektchau@polyu.edu.hk), Sia Nemat-Nasser (sia@ceam.ucsd.edu), Thomas N. Farris (farrist@purdue.edu), and Hiroyuki Abe; 3) Symposium on Recent Advances in Microstructural Mechanics and Damage Mechanics of Materials, organized by Drs. Lizhi Sun (lizhi-sun@uiowa.edu), Chi L. Chow (clchow@umich.edu), H. Eliot Fang (hefang@sandia.gov), and J. Woody Ju (juj@ucla.edu); 4) Symposium on Analysis of Metal Deformation and Ratcheting Failure Processes, organized by Drs. Marwan Khraisheh (khraisheh@engr.uky.edu), Jyhwen Wang (jwang@tamu.edu), Glenn J. Grant, Pacific (glenn.grant@pnl.gov), and Tasnim Hassan (thassan@eos.ncsu.edu); and 5) Symposium on Time-Dependent Behaviors in Polymer Composites and their Matrices, organized by Dr. R. Hall (Richard.Hall@wpafb.af.mil).

Meetings of the AMD-MD Joint Committee on Constitutive Equations will be held at all ASME conferences, current members are encouraged to bring new ideas and proposals for symposia for future meetings, and new members are always welcome. •

Committee on Composites

Iwona Jasiuk, Chair • iwona.jasiuk@me.gatech.edu

At the AMD Composites Committee meeting held on November 18, 2003 in Washington,

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D.C., Dr. Ann Marie Sastry of University of Michigan was elected Vice-Chair (to become Chair in 2004-2005). At the 2003 IMECE, the AMD Composites Committee organized/ co-organized the following symposia (6 sessions): Nanocomposites (1 session) organized by H. Mahfuz, L.A. Carlsson and V. Vaddakke, Sandwich Composites (1 session) organized by Y. Rajapakse and L.A. Carlsson, Contact and Damage in Composites (1 session) organized by N. Katsube, Novel Approaches in Modeling of Heterogeneous Materials (1 session) organized by I. Jasiuk and A. Zubelewicz, Impact Dynamics (1 session) organized by U. Vaidya, and Durability and Damage Tolerance of Composites (1 session) organized by A. Karlsson.

The following 5 symposia (total of 8 sessions), organized by the AMD Committee, will be held at the 2004 IMECE: Sandwich Composites (2 sessions) organized by V. Birman and L.A. Carlsson, Durability and Damage Tolerance of Heterogeneous Material Systems (1 session) organized by A. Karlsson and I. Jasiuk, Time-Dependent Behavior in Polymer Matrix Composites and Polymers (1 sessions) organized by R. Hall, Nanocomposites (2 sessions) organized by E. Ayorinde and X.-L., and Dynamic Response of Composite Materials (2 sessions) organized by U. Vaidya and S. Abrate. The original request to the AMD was for 6 symposia (16 sessions).

Next meeting of the AMD Composites Committee will be held at the 2004 IMECE. Members are encouraged to bring new ideas and proposals for symposia for the incoming ASME meetings, and membership in the Committee is open. We encourage researchers interested in composite materials to join this dynamic committee by attending the next committee meeting (or contacting chair) and to become active in the committee's activities. •

Committee On Dynamics And Control Of Structures And Systems

H.S. Tzou, Chair • hstzou@engr.uky.edu

Dynamics and Control of Structures and Systems (DCSS) Technical Committee sponsors four symposia and co-sponsors one symposium with the DSC Division at the 2004 IMECE. The symposia include 1) Nonlinear Dynamics, Control and Stochastic Mechanics Symposium (four sessions) organized by Bogdan Epureanu (U of Michigan), Marco Amabili (U of Parma, Italy) and George Flowers (Auburn U); 2) Multi-field Coupling in Dynamic Systems and Control Symposium (two sessions) organized by Eric Mockensturm (Penn State U) and H.S. Tzou (U of Kentucky); and 3) Advances in System Identification Techniques Symposium (one session) organized by Chin Au Tan (Wayne State U) and Carole Mei (U of Michigan). DCSS (AMD) and Vibration/Noise Control Panel (DSC) co-sponsor the 11th Symposium on Active Control of Vibration and Noise (two sessions), organized by Jiong Tang (DSC) (U of Connecuit), Nader Jalili (DSC) (Clemson U) and H.S. Tzou (AMD) (U of Kentucky). DCSS appreciates the efforts and hard work of these organizers for the successful 2004 IMECE DCSS program. •

Committee on Dynamic Response of Materials

Wayne Chen, Acting Chair • weinong@u.arizona.edu

The committee met on November 17, 2003 during the 2003 ASME International Mechanical Engineering Congress in Washington, DC. Eleven attendees were present during the meeting. The committee reviewed the status of past session organization activities and agreed to sponsor or co-sponsor sessions during the upcoming IMECE 2004 in Anaheim, CA: Dynamic Fragmentation of Brittle Materials organized by Phillippe Geubelle of UIUC and Sergey Shkarayev and Wayne Chen of University of Arizona; Advanced Nondestructive Evaluation Techniques for Damage Characterization and Remaining Life Estimate organized by Jianmin Qu of GeorgiaTech and Tribikram Kundu of University of Arizona; and High Rate Response of Ductile Materials organized by John Lambros of UIUC and K.T. Ramash of Johns Hopkins University.

The current officers of the committee are Wayne Chen (University of Arizona) – Acting Chair, and Michael "Mick" Peterson (University of Maine) – Secretary. The committee will vote for a new officer at its next meeting during IMECE 04. •

Committee On Elasticity

Demitris Kouris, Chair • kouris@uwyo.edu

The Committee on Elasticity sponsored two symposia during the 2003 IMECE: (a) Mechanics of Biological Materials - Gang Bao, H. Gao, and P. LeDuc as well as (b) Novel Approaches in Modeling Hetero-geneous Materials – I. Jasiuk and A. Zubelewicz. Both symposia were very well attended and could have utilized additional sessions.

During the Committee meeting on November 18, Professor Huajian Gao was presented with the ASME Fellow certificate. He was also nominated and elected as a Fellow by the Elasticity Committee on September 2, 2003.

Three symposia were proposed for IMECE 2004 to include: (a) "Nanomechanics of Materials: Modeling on Multiple Length Scales" – organized by Robert Kukta and Pradeep Sharma (2 sessions); As nanotechnology is moving from the realm of research to engineering design, there is tremendous demand for efficient yet robust models that capture the mechanical behavior of materials at the nanoscale. This broad symposium will cover various modeling techniques, including ab initio, atomistic, mesoscopic and continuum, with a focus on establishing links between length scales. Papers of multidisciplinary nature are highly encouraged. Topics of interest include but are not limited to: multiscale modeling, nonlocal/ multipolar theories, size-effects and plasticity at the nanoscale, modeling of defects, surfaces and interfaces, thin films, electronic and biological materials, constitutive modeling and the evaluation of non-traditional material constants through experimental, *ab initio*, or atomistic techniques.

(b) "Self assembly in electronic and biological systems" – organized by Vivek Shenoy and Surya Ganti (4 sessions). Concepts of self-assembly (both spontaneous and assisted) provide an important pathway for next generation materials and devices. Enhancing the fundamental understanding of self-assembly in biological and other material systems holds a lot of promise for manufacturing of bio-inspired structures and devices, and many novel electronic and optical material systems. Applications include lightweight, damage tolerant structures, sensors, to quantum dots and wires, single electron transistors, lasers, LEDs etc. Papers will be solicited that advance the understanding of self-assembly in diverse media and focusing in one of the following four areas:

- Physics of self-assembly
- Electrical, mechanical and optical behavior of self-assembled systems
- Processing and fabrications of such systems
- Applications of self-assembly processes to various biological and opto-electronic systems.

(c) Symposium honoring David Barnett for his 65th birthday – organized by Xanthippi Markenscoff and Tom Ting (2-3 sessions).

Eventually, AMD appropriated enough sessions for symposia (a) and (b). We hope to see all of you at the IMECE 2004, in Anaheim next November! •

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Committee On Experimental Mechanics

John Lambros, Chair • lambros@uiuc.edu

The Committee held its regularly scheduled meeting on Monday 17, 2003 during the IMECE 2003 in Washington DC. The new Committee officials, who took over on July 1, 2003, are John Lambros (University of Illinois, Urbana-Champaign), Chairman, and Ruquiang Feng (University of Nebraska, Lincoln), Secretary. A sub-committee consisting of Ken Liechti and Jeff Kysar continued its efforts to identify and nominate eligible members of the community for some of the ASME awards. The Committee has also been very active in organizing sessions during both the 2003 and the upcoming 2004 IMECE. Many of these sessions are co-sponsored with the Dynamic Response of Materials and the Fracture and Failure Technical Committees. This cross-committee cooperation has allowed sessions of broad relevance to be organized, which consequently have been very well attended. In IMECE 2003 symposia co-sponsored by the Committee included three sessions on the "Failure Mechanics at the Nanoscale and Microscale" (organized by J. W. Kysar and K. Liechti), one session on "Dynamic Response of Soft Materials" (organized by R. Feng), and one session on "Dynamics of Friction" (organized by W. Chen and R.J. Clifton). The Committee is currently co-sponsoring six sessions for the IMECE 2004 to be held in Anaheim, CA. The Committee is continuing its work to draft specific operating procedures in accordance with the rules of the AMD. K. Ravi-Chandar has taken over this task which will hopefully be completed by the next regularly scheduled Committee meeting during the IMECE 2004 meeting.

Finally, I would like to thank the many individuals (committee members, symposia organizers, chairs and co-chairs, symposia participants, etc.) who have volunteered their time and work to bring the Committee's efforts to fruition. Their active participation is the cornerstone of the continued healthy functioning of the Committee. Membership in the Committee is open and I encourage anyone interested in experimental mechanics to articipate in the IMECE 2004 Committee meeting or to contact the Committee chair or secretary with any comments. •

Committee on Fluid Mechanics

Tayfun E. Tezduyar • tezduyar@rice.edu

At the 2004 ASME International Mechanical Engineering Congress, in Anaheim, California, November 13-19, 2004, the Fluid Mechanics Committee is sponsoring, jointly with the Committee on Computing in Applied Mechanics, a five-session mini-symposium. The mini-symposium is titled "Challenges and Advances in Flow Simulation and Modeling" and is organized by Tayfun E. Tezduyar (Rice University), Yoichiro Matsumoto (University of Tokyo) and Thomas J.R. Hughes (University of Texas at Austin). Three of the sessions will focus on "Fundamental and Enabling Technologies" and two on "Moving Boundaries and Interfaces". The sessions will take place on Tuesday, November 16 (2:00PM-7:00PM) and Wednesday, November 17 (2:00PM-5:15PM). Some of the leading researchers in flow simulation and modeling will give presentations at this mini-symposium. Many of the speakers will be from the USA and Japan, but we will also have speakers from Argentina, France, Germany and Italy.

Professor Keith Stein (Department of Physics, Bethel University) was designated as the Vice Chairman of the Fluid Mechanics Committee at the 2003 ASME International Mechanical Engineering Congress, in Washington, DC, November 16-21, 2003. After a very distinguished career at the US Army Natick Soldier Center, Dr. Stein joined Bethel University in 2001, his alma mater. He is one of the leading researchers in parachute modeling, fluid-structure interactions, and mesh moving methods. •

Committee on Fracture and Failure Mechanics

Jack Beuth, Chair • beuth@andrew.cmu.edu

A new group of fracture and failure mechanics technical committee (FFMTC) officers began their two-year terms at the IMECE '03 meeting. The new officers are Jack Beuth (Carnegie Mellon), chair; John Lambros (UIUC), vice-chair; and Mark Walter (Ohio State), secretary. The committee maintains a web site at the address: http://www.asme.org/divisions/amd/committees/fracture/index.html.

The web site is updated 2-3 times per year and includes announcements, minutes from committee meetings, procedures for proposing symposia to the committee, and a list of committee members. The FFMTC currently has 44 members. The committee is an open one. Those interested in participating in FFMTC activities are encouraged to attend the committee's annual meeting at the IMECE conference.

The FFMTC sponsored or co-sponsored 4 symposia for the IMECE '03 meeting in Washington, DC. The were: "Failure Mechanics at the Nanoscale and Microscale," organized by Jeffrey Kysar (Columbia), Kenneth Liechti, (UT, Austin) and Sanjeev Khanna (Missouri, Columbia); "Integrated Experimental and Computational Failure Analysis," sponsored by Raman Singh and Toshio Nakamura (SUNY, Stony Brook); "Failure of Coatings and Interfaces," sponsored by Mark Walter (Ohio State) and "Dynamic Failure Response of Multiphase and Heterogeneous Materials," organized by Ruqiang Feng (Nebraska, Lincoln).

The committee's last meeting was during the 2003 IMECE and was attended by 14 members. The primary topic of discussion was the consideration of proposals for symposia to be sponsored by the committee at the IMECE '04 meeting in Anaheim. The FFMTC will sponsor or co-sponsor 7 symposia at the 2004 meeting. Symposium organizers include Ashraf Bastawros (Iowa State), Jeffrey Kysar (Columbia), Sinisa Mesarovic, (Washington State), Yozo Mikata (Lockheed Martin), Xi Chen (Columbia), Ching-Shan Cheng (General Motors), Philippe Geubelle (UIUC), Sergey Shkarayev (Arizona), Weinong Chen (Arizona), Ioannis Chasiotis (Virginia), Sanjeev Khanna (Missouri, Columbia) and Jack Beuth (Carnegie Mellon). •

Committee on Geomechanics

Anil Misra, Chair • misraa@umkc.edu

The Geomechanics Committee held its annual meeting at the 2003 ASME Mechanics and Materials Conference, June 17-20, 2003, Scottsdale, AZ. The committee sponsored a 2-session symposium on Recent Development in Geomechanics organized by K. T. Chau, Anil Misra and C. S. Chang at that conference. •

Committee on Instability in Solids and Structures

Edmundo Corona • ecorona@nd.edu

The committee participated in the Summer Meeting of the Applied Mechanics and Materials Divisions in Scottsdale, AZ by sponsoring two sessions, one on instabilities of foams organized by S. Kyriakides and another on general instabilities. A three-session symposium on instability in solids and structures was conducted at the 2003 Congress, organized by S. Kyriakides and E. Corona. Many thanks to all participants for their contributions. A similar symposium has been organized for the 2004 congress. •

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Committee On Uncertainty and Probabilistics (COUP)

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The Committee On Uncertainty and Probabilistics met on November 18, 2003 as part of the IMECE in Washington, D.C. At this meeting, all members voted on the final version of the by-laws that had been previously distributed. These by-laws are posted now on the official Web Site of the Committee, which was created in December 2003 (http://www.asme.org/divisions/amd/committees/techcomm.html). The Vice President for the Graduate Program from the National Institute of Aerospace (NIA) presented an overview of NIA and the new research opportunities for Probabilistic research resulting form the establishment of the new NASA Engineering Safety Center. The Committee has planned a two-sessions symposium at the next IMECE in Anaheim on November 13-19, 2004 in collaboration with the Adaptive Structures and Materials Committee on Adaptive Structures. Further, the Committee organized two additional sessions at the ASCE Probabilistic Mechanics Conference on July 26-28, 2004 in Albuquerque. Moreover, the Committee planned a session at the International Conference on Structural Safety and Reliability on June 19-22, 2005 in Rome. The next meeting of the Committee will take place at the IMECE Congress in Anaheim, however, as discussed at the last meeting, members have suggested that we hold our annual committee meetings as part of the ASME/AIAA/ASCE SDM meeting normally held in April. The Committee Chair and Co-Chair next year will be Mohammad Noori from North Carolina Sate University and Lori Graham-Brady from Johns Hopkins University, respectively. •

Reality is merely an illusion, albeit a very persistent one.—Albert Einstein

Executive Committee 2004–2005