



# AMD

## Applied Mechanics Division Newsletter

Lori Graham, Editor

Summer 1998

### Report of the Chair



AMD Chair  
S. A. Berger

This was another highly rewarding year for the Applied Mechanics Division, highlighted by exciting meetings, new awards and medals, recognition of many of our distinguished members, etc. One of the most impor-

tant of these was the establishment, based on the proposal and financial support of the AMD, of the Daniel C. Drucker Medal as an ASME medal. This Medal, named after Dan Drucker - distinguished scholar, educator, outstanding engineering educational and professional leader (including the presidency of the ASME) - will be "bestowed in recognition of sustained, outstanding contributions to applied mechanics and mechanical engineering through research, teaching and/or service to the community". This new medal is the third AMD-sponsored ASME-level honor. It complements the Timoshenko and Koiter Medals, also ASME medals, the latter approved two years ago. It carries with it an honorarium of \$1,000 and reimbursement for travel expenses to the IMECE for the presentation. An ad-hoc committee to raise money for the funding of the medal, chaired by Chuck Taylor, has received contributions of \$11,000 from universities and individuals and \$14,000 from the AMD, meeting the minimum endowment of \$25,000 required by the ASME. Fund-

raising efforts will continue to raise a total of \$50,000. As with the Timoshenko and Koiter Medals, it will be administered, and the nominee chosen, by a special Drucker Medal Committee consisting of the five current members of the AMD Executive Committee, the past five years' Division Chairs, and the past five Drucker Medalists. The AMD proposal for the Medal was approved by the ASME Committee on Honors and Board of Governors at their meetings during the '97 IMECE. The recipient of the first Medal was Dan Drucker himself, his nomination having won approval from the Committee on Honors at its April, '98 meeting. The Medal was conferred at the 13th U. S. National Congress of Theoretical and Applied Mechanics at the University of Florida in Gainesville in June, '98.

In adding the names of Warner Koiter and Dan Drucker to that of Stephen Timoshenko in the pantheon of giants of applied mechanics and mechanical engineering by naming ASME medals for them, the AMD has come a long way in redressing the lack of adequate awards to recognize individuals who have made outstanding contributions to applied mechanics. On behalf of the Division I want to thank Tom Cruse and Carl Herakovich, the two most recent past Chairs of the AMD, for having steered the nominations for the Koiter and Drucker Medals, respectively, through the ASME. For a number of years the Executive Committee has felt that we should also recognize outstanding young investigators. To that end the Division has now established

(continued on page 3)

### 1997 Timoshenko Medal



Timoshenko  
Medal Recipient  
J. R. Willis

Professor J. R. Willis was awarded the Timoshenko Medal at the Applied Mechanics Dinner at the 1997 IMECE in Dallas.

John R. Willis is widely regarded as one of the most inventive problem solvers working

within the field of solid mechanics today. Dating back to his earliest work in the 1960's, he has tackled some of the most challenging and important theoretical problems in the broad area of the mechanics of solids. He has made seminal contributions to the mechanics of cracks with application to fracture mechanics, to dislocation mechanics, to general solution methods for anisotropic elastic solids, and to the development of methods for determining the macroscopic properties of composite materials. He single-handedly initiated the modern field of nonlinear composites. As has been the case in all the areas he has chosen to work, he invented new solution methods and used these methods to solve new difficult problems. In each of the areas, Willis' contributions have pushed theoretical understanding well beyond the state of knowledge existing prior to

(continued on page 5)

# Mechanics of Research\*

by J. R. Willis  
University of Cambridge

The award of the Timoshenko Medal is a singular and unexpected honour. I thank my friends who exaggerated my case so successfully, and promise them that I shall do my best to justify their faith in the future, even if I have not managed it in the past.

I'm not sure if I should say this, but I will. I have attended one Applied Mechanics Division Dinner previously. Bernie Budiansky received the Timoshenko Medal. I was surprised that he spoke for so long! Now I realize why. It was no ordinary after-dinner speech but the Timoshenko Lecture, and its length is prescribed. Therefore, I can only advise now that you settle down and prepare to let your thoughts wander!

A technical exposition is clearly not required, and I sought inspiration, or at least examples of how to proceed, by reading the lectures of a few previous medalists. It seemed to me that I might try to follow, in some approximate way, the path taken by George Batchelor, who was also my boss at a formative time in my career. He was founder and head of the Department of Applied Mathematics and Theoretical Physics in Cambridge.

I was fortunate enough to hold junior posts there, between 1965 and 1972, and perhaps am now even more fortunate to hold a senior post in that department. George is no longer its head but he is there every day, providing an example of dedication to research and scholarship in mechanics.

This, in fact, will be my theme: how does a career develop, in which perhaps the most significant component is research? Naturally, this will relate to applied mathematics and mechanics, because that is all that I know.

The main focus of George's lecture was how an institution should be organised to stimulate invention and research, and I shall try to address a somewhat similar question.

Yapa Rajapakse asked me the other night what would be the title of my talk. I told him that I hadn't given one, but perhaps an appropriate title would be "Mechanics of Research". My concern will be how an individual should position himself or herself, to do fruitful research. So, in particular, what should someone just starting out do, and expect?

To begin, it pays to be good at passing exams. Otherwise, acceptance in a good research school is likely to be difficult. It pays also to have a thesis adviser who has the right sense of what might be important in the future as well as tractable now, with the right amount of effort. This is not always so easy to achieve. Paul Matthews, a physicist of great distinction (I knew him when he was Vice-Chancellor of the University of Bath, where I spent many happy years as a Professor), told me that, when he was a young research student in the Cavendish Laboratory, he one day approached Paul Dirac and asked him if he might be willing to supervise his research. Dirac's response, utterly sincere and modest, was that he didn't need any help with his problems at that time.

Few of us have the opportunity to acquire such an anecdote. There is, however, an uncomfortable lesson to be learned by all at this stage. Being clever may be necessary, but it certainly is not sufficient! It is still more important to have commitment and true interest in what you are doing. While a bit of competitive spirit is surely no bad thing (and may be almost essential), the pleasure of achievement against your own standards should be -- probably has to be -- your main reward, since it is certain, whoever you are, that you will see people around you who have more talent, and have done much more significant research than you are ever likely to do yourself. I am reminded here of another story I was once told. I am not sure now whether it was told me by Jock Eshelby, or about him: as a young research student, he went to see a great elder statesman of solid state physics, and asked what were the really significant areas in which an aspiring researcher should concentrate. The reply

was, "I don't know. And if I did, I wouldn't tell you!". Or perhaps Jock was the elder statesman: those that knew him can surely imagine him making such a response, mixing humour with truth! The fact is that, unless you are exceptionally lucky, you have to have your own ideas and be satisfied with them.

Having done your first research, and obtained your PhD, the next problem is to find a position which will allow your research to flourish. I wish I could advise here. My own experience is useless, since when I was at that stage, there were more good jobs than there were people to fill them, and I remember with appreciation one of the services my thesis adviser, Maurice Jaswon, rendered at that time. He took sabbatical leave in the USA, and I was able to monitor some of his movements from job offers that I received. I actually took a post-doctoral position at the Courant Institute, New York, and had the benefit of learning from some of the greats of applied mathematics, including Joe Keller, another Timoshenko Medallist. There are two problems now, or so it seems to me.

One is that jobs are scarce. The other is that there is pressure to behave immediately as though you are a great leader, attract research funds and perhaps have more graduate students than is comfortable for you or them. I do believe that foundations have to be laid, by personal study and contemplation. Better to become a motivator and facilitator later! And in any case, you won't survive long-term as a generator of ideas, unless you are doing quite a bit of research personally. Clearly, these days, some compromise is necessary. I would like to think that talent is recognised not only by amounts of money attracted, or numbers of publications, though it would be quite wrong to infer that independence from these activities as demonstrated by failure to deliver necessarily implies true commitment, or ability, or depth. A positive aspect of the grant culture is that research driven by practical concerns can have fundamental significance and, even when it does not, involvement in such research can provide a perspective from which important generic or fundamental problems may be identified.

Assuming that you keep going successfully, and achieve a senior position either in a University or a Research Department, you surely will acquire wider responsibilities. These are likely to include responsibility for the welfare (and livelihood) of others, and may also involve administration concerning the research infrastructure of your discipline.

I think particularly here of activities relating to publishing. We almost all act as referees (except for those -- some very distinguished -- who just don't respond!) and some of us act as journal editors.

I have to admit that I sometimes suspect that people these days write more than they read -- including, in some cases, papers upon which the person's name appears as author! But enough of that, and back to the functions of an editor. This is not a research activity, but (I do my best to remind myself) it does make an important contribution to the collective scientific endeavour. Furthermore, although you certainly can't please everyone all the time, it is my experience that the job can make you more friends than enemies. The thing to remember is that you can't know everything, so you must take the best advice that you can find and then (even when the advice is inadequate, as it can be on occasions!) take a decision in as honest a fashion as you can. Just occasionally, you may have the opportunity to promote some of the first work of someone destined to be a star. This is a real satisfaction. And this reminds me of something else that goes with age and seniority: if you become a head of department -- or similar -- and have the opportunity to make appointments, you must never be afraid of appointing someone you suspect may be better than yourself. I have done this many times. Not only is it essential for the well-being of your unit, but you actually derive credit as well as benefit for your own research.

I realize that I started with the intention of making general comment but have lapsed into personal reminiscence. Now I would like to do this still more explicitly. Certainly the progress of my career has been influenced greatly by various colleagues that I have had. After NYU, I went to Cambridge on the initiative of Rodney Hill.

Of course he is impossible to emulate, but I saw an example towards which to aspire. Also at Cambridge, I interacted with Jock Eshelby, whose papers had already been one of the foundations of my education. I always knew that my main contribution would be mathematical, and I learned important lessons from Gerard Friedlander and Edward Fraenkel in particular.

When I was still relatively young, I moved to the then new University of Bath. Over the next few years, I had the great good fortune to appoint outstanding colleagues, and I learned some more mathematics particularly from John Toland. I also had several excellent students and post-docs. In particular, David Talbot was my student more than 20 years ago. He is still a major collaborator and I am happy to acknowledge my debt to him. One of my best post-docs was Pedro Ponte Castañeda.

Again, we have interacted over the succeeding years to my distinct advantage. When I first returned to Cambridge, I was fortunate to have Pedro as one of my early visitors. Another was Walt Drugan, who was never my student or post-doc but I wish he had been. This is one of the advantages of working in a location that others consider attractive. In the three and a half years I have been back, I have had the benefit of a succession of distinguished long-term visitors including, besides Pedro and Walt, Huajian Gao and Zvi Hashin. I have also, in recent years, done my own share of travelling, and my most frequent single destination has been the laboratory of Sia Nemat-Nasser, where there is always something new and exciting for me to learn.

Travelling and editing a journal do not form an ideal mixture, and would have been much more difficult to combine if I had not had the fortune to have Ben Freund as an outstanding co-editor of JMPS. During periods that I am away, he continues -- I expect -- to feed copy to the press, so that short absence is not a problem.

One of the most significant world events of the last few years had impact on me and my research too: the demise of the Soviet Union made available many researchers of great ability, prepared to take more junior positions than objectively they deserved. In my case, I had successively as post-docs Sasha Movchan, Valery Smyshlyaev and Natasha Movchan. I can only liken working with them to driving a powerful car: you touch the accelerator and really move! They all three now have secure positions and do not need me, but still we collaborate, and I get (some of) the credit for their hard work and talent.

This, perhaps, leads me to my final piece of advice: when you get the chance, collaborate with talented younger researchers as much as you can. Few activities can be more rewarding. In my case, this goes a long way towards explaining my presence this evening. Now I would like to conclude, expressing my deep gratitude to all those with whom I have had the good fortune to interact during my career so far, coupled with keen anticipation of more in the future.

\*The text of the Timoshenko Medal Acceptance Speech delivered at the Applied Mechanics Dinner at the 1997 IMECE.

## Applied Mechanics Reviews

**I**n 1997 Applied Mechanics Reviews celebrated its 50th anniversary. Among the special things that occurred was the publication of Retrospectives for the first time. These were written by three truly outstanding, senior research scholars -- Hans Liepmann, John Miles and George Batchelor -- all of whom happen to be fluid mechanics. However, many others have been invited during the past two

years, embracing all areas of mechanics. We are publishing more of them in the current year, and want to reach the point, eventually, where we have one in each monthly issue. I found the first three to be very interesting to read. In particular I would recommend that all researchers read the Retrospective "Research as a Life Style", the essay by George Batchelor that appeared in the August, 1997 issue.

We are also publishing many more review articles now than in years past. In 1997 there were 28 articles on a variety of topics, as well as a Special Issue on Thermal Stresses, edited by Richard Hetnarski. We have had three articles per issue for many months, and expect to be able to continue this in the future. I would like to point out, especially, the article "Applied Mechanics in Science and Engineering", by Yih-Hsing Pao which was published in the February, 1998 issue. This monumental effort traces the historical development of applied mechanics as a field, as well as its relationship to science and engineering.

The truly international character of AMR continues to evolve. More than half of our review article authors of the past two years are from outside the U.S. We have approximately 40 Associate Editors who seek review articles and manage their refereeing. In recent months several more non-U.S. ones have been added, so that they currently comprise half of the total. We are continuing to add book reviewers from abroad. The field of mechanics is truly worldwide, and AMR will do its best to reflect this.

ARTHUR W. LEISSA, *Editor-in-Chief*

## Chair's Message

(continued from page 1)

The Special Achievement Award for Young Investigators in Applied Mechanics. The award is to be bestowed on researchers age 40 or younger in recognition of contributions to applied mechanics, in the form of outstanding published papers, and the demonstration of considerable potential for significant future work. The awardee will be selected by the Executive Committee and the awards presented at the annual AMD Banquet at the IMECE, the first one at Anaheim, '98 (for nominations contact J. Tinsley Oden).

The Robert Henry Thurston Lecture, established in 1925 to honor the first president of the ASME, and presented at the IMECE by a lecturer chosen by the Basic Engineering Technical Group (BETG), is being upgraded to a Society award, to be known as the Thurston Society Award. The AMD has joined the other four Basic Engineering Group Divisions in committing itself to contribute \$1000 per year for the next five years to establish the award,

which will be administered by a committee with a representative from each of these Divisions.

Our first big conference of the '97 calendar year was the Joint Summer Meeting at Northwestern, McNU '97, a joint meeting of the AMD, the MD, together with the ASCE and SES. The meeting was superbly organized by Wing Kam Liu, Leon Kerr, Brian Moran and their colleagues at Northwestern, continuing a tradition of earlier summer meetings. Increasingly, AMD members, in word and attendance, are favoring these more focused summer meetings over the much larger IMECes. Unfortunately, though, there has been very little focus on fluid mechanics at these meetings. S. Nemat Nasser confirmed on behalf of the Materials Division their agreement to continue the coordination of joint AMD-MD summer meetings for at least the next five years. There will not be such a meeting in 2000, however, because of the IUTAM International Congress on Theoretical and Applied Mechanics in Chicago that summer.

The annual IMECE still remains the major event of the year for the AMD, with meetings of all the TCs, the AMD dinner, honors and awards decided and awarded, hundreds of papers, etc. The '97 IMECE in Dallas was no exception. Kudos to Alan Needleman for his flawless innovative handling of every aspect of the AMD part of the meeting, the scheduling and arrangements for paper sessions, symposia, committees, and handling the countless other details of such a large meeting. A highlight of the meeting is, of course, the Applied Mechanics Dinner, at which the Timoshenko Medal is presented and the Medalist speaks about his career and work. The '97 Medalist was John R. Willis, Professor of Theoretical Solid Mechanics in the Department of Applied Mathematics and Theoretical Physics at Cambridge University (see related articles). The Applied Mechanics Award is also presented at the dinner. The Award for '97 was presented to Richard Skalak, Professor at the University of California at San Diego. Unfortunately it was awarded posthumously and was accepted by his son Tom, a professor at the University of Virginia. Skalak was one of two former Chairs of the AMD Executive Committee to pass away in 1997 - the other, Nicholas Hoff, Professor Emeritus at Stanford University, passed away in August '97. Koiter, the first winner of the ASME medal named in his honor, also passed away in '97.

There has been some confusion and a good deal of upset about the AMD's symposium volume policy. You may recall, because the ASME a number of years ago transferred financial liability for them to individual Divisions, the AMD voted not to publish such volumes, except when there were co-sponsoring Divisions

which assumed this responsibility. The symposia volumes are now profitable. While publication of exclusively AMD symposium volumes will continue to require approval of the Program Committee Chair, acting for the AMD Executive Committee, symposium organizers should not feel discouraged from submitting such requests.

There is a separate report from Lew Wheeler, Editor of JAM, but I do want to note that JAM is the most profitable of the 17 ASME transactions journals, last year accounting for 15% of the \$1.7M profit of these journals. In a recent study JAM led all transaction journals in citations, 5200, the second being the Journal of Heat Transfer with 2000. Pending with the ASME Publications Committee are requests for the elimination of mandatory page charges and page limitations.

The primary membership of the AMD is about 6000 (secondary membership 5000, and an additional 5200, 3rd and 4th choices), making it the largest of the five Basic Engineering Group Divisions. As of 3-31-98, the AMD Custodial Account balance was \$24,500, but given our current commitments, for example to endowments for the Drucker and Thurston awards (see above), and potential future obligations and commitments not unusual for a Division of our size and responsibilities, our finances are rather marginal. This is all the more so when compared with other Divisions. Taking note that the financial health of at least some of these other Divisions results from their summer meetings, the EC has proposed that the usual \$5/paid registrant contribution to the AMD from AMD-co-sponsored summer meetings be increased to \$15. The EC will continue to explore other ways to improve the financial health of the Division.

As I end my term on the AMD EC it remains to thank all the current members of the EC, Lallit, Alan, Tom, and Dusan, for having carried out each of their mandated responsibilities so efficiently and cheerfully; the former Chairs, particularly Carl, to whom I often turned for information and sage advice; our various AMD Editors, Technical and other Committee Chairs and members; our able ASME Technical Administrator Alex Majewski; and others (meeting and symposia organizers, program chairs, etc.) who, unheralded and generally unpaid, make possible much of what we proudly associate with the AMD. It remains lastly to welcome Hassan Aref as the newest member of the EC.

Footnote: This report was tardy enough to allow me to announce the most recent honors voted by the Committee on Honors. The '98 Timoshenko Medalist is Olgierd Zienkiewicz of the University of Wales Swansea, the '98 (and second) Koiter Medalist is Viggo Tver-

guard of the Technical University of Denmark, the '98 (and first) Drucker Medalist is Dan Drucker, and AMD EC member, Tom Hughes, has been awarded the '98 Worcester Reed Warner Medal.

S. A. BERGER, *Chair*

## USNC/TAM

One of the activities of the USNC/TAM is the publication of overview volumes on different areas of mechanics. So far, two such volumes have been published. Volume 1 on Research Directions in Computational Mechanics (NAS Press 1991) under the direction of Tinsley Oden, and Volume 2 on Research Directions in Fluid Dynamics (AIP Press 1996), edited by J. L. Lumley, Andreas Acrivos, Gary Leal and Sidney Liebovich. The third volume, on Research Trends in Solid Mechanics (RTSM), will follow in the near future with completion anticipated in the Fall of 1998. George Dvorak is editing the volume with advisory panel members: Jan Achenbach, Zdenek Bazant, Richard Christensen, Ben Freund, Yapa Rajapakse and Jim Rice.

Pol D. Spanos stepped down as editor of the USNCTAM Newsletter after serving most effectively for the inaugural seven years of its life. Carl T. Herakovich has assumed the duties of Newsletter editor.

U.S. members of the mechanics community were elected to positions in IUTAM at the Kyoto meeting in August, 1997. Dan Drucker and Bruno Boley were both re-elected to additional terms as Members-at-Large of the General Assembly. L. Ben Freund was elected to a four year term as Treasurer of IUTAM. As Treasurer of IUTAM Ben is a member of the Bureau and the General Assembly of IUTAM.

A WWW-homepage for the USNC/TAM has been established under the direction of Jim Hill. Maintaining and upgrading the web page will be an ongoing process and all members of the mechanics community, are encouraged to participate. The website can be found at the URL <http://www.public.iastate.edu/~usnctam/>. Comments and suggestions should be sent to Jim Hill at [jchill@iastate.edu](mailto:jchill@iastate.edu).

USNC/TAM officers for 1997-98:

Chair	Earl Dowell
Vice Chair	Roben Brodkey
Past Chair	Gary Leal
Past Chair	J. Tinsley Oden
Secretary	Philip G. Hodge

Proposal Kits for future IUTAM Symposia can be obtained from Phil Hodge at Stanford ([hodge@am-sparc7.stanford.edu](mailto:hodge@am-sparc7.stanford.edu)). Kits for symposia in 2001-02 will be due in early January, 1999.

Following is an abbreviated listing of IUTAM Symposia planned for 1999:

Laminar-Turbulent Transition, Arizona, USA, W. Saric & H. Fasel

Advanced Mathematical and Computational Mechanics Aspects of the Boundary Element Method, Gliwice, Poland, T. Burczynski & T. A. Cruse

Geometry and Statistics of Turbulence, Tokyo, Japan, Kambe

Scaling Laws in Sea Ice Mechanics and Sea Ice Dynamics, Clarkson NY, USA, J. P. Dempsey & H. H. Shen

Mechanical and Electromagnetic Waves in Structured Media, Sydney, Australia, R. C. McPhedran

CARL T. HERAKOVICH,  
*ASME Representative*

## Applied Mechanics Award to Skalak

Professor Richard Skalak received the Applied Mechanics Award at the 1997 IMECE in Dallas, "in recognition of his distinguished contributions to mechanics, and his distinguished service to the engineering community". Born in New York City in 1923, Dr. Skalak received a B.S. in C.E., a C.E. degree, and the Ph.D. in Engineering Mechanics, all from Columbia University. Following service in the U.S. Navy, he was appointed to the faculty in civil engineering and engineering mechanics at the Columbia School of Engineering, reaching the rank of full professor in 1964. He was Chair of the C.E. Department from 1985 to 1988, and served as James Kip Finch Professor of Engineering Mechanics from 1976 to 1988. He was founder of the Institute of Bioengineering at Columbia, serving as Director from 1985 to 1988, when he moved to the University of California, San Diego, to take up an appointment as Professor in the Applied Mechanics and Engineering Science Department. There he also served as founding director of the NSF-funded Institute for Mechanics and Materials.

Dr. Skalak held editorial positions with numerous journals, including Editor of the ASME Journal of Biomechanical Engineering. He served as president of the Society of Biomedical Engineering ('83), vice-president of the SES. In the same year, 1979, he was, simultaneously, Chair of the Executive Committees of the Applied Mechanics Divisions of the ASME and the ASCE!

Dr. Skalak was the recipient of many honors and awards from engineering societies, including the ALZA Medal (Biomed. Eng. Soc., '83), the Th. von Karman Medal (Eng. Mechs. Div., ASCE, '87), the Poiseuille Medal (Int. Soc. of Biorheol., '89), and, from the ASME, the Lissner Award (Bioeng. Div., '85) and the Melville Medal ('90). He was elected to the National Academy of Engineering in 1988.

Professor Skalak passed away at his home in San Diego on August 17, 1997. The award was accepted posthumously in Dallas by his son, Tom, a professor in the biomedical engineering department at the University of Virginia.

While it may well be that the historic record will principally remember Skalak as one of the preeminent biomechanicians of the latter half of the 20th century, it will, or should, note that what made his work in this field so outstanding was its grounding in his encyclopedic knowledge of mechanics and his analytical and numerical skills in applying this knowledge. In addition to training two generations of scholars, Skalak shared ideas freely and generously with colleagues and will be sorely missed.

S. A. BERGER

## AMD Honors and Awards

The following AMD members received ASME Awards:

Daniel C. Drucker Medal: Daniel C. Drucker, Warner T. Koiter Medal: Viggo Tvergaard, Timoshenko Medal: Olgierd C. Zienkiewicz, Worcester Reed Warner Medal: Thomas J. R. Hughes, Applied Mechanics Award: Richard Skalak.

The following AMD members were recently elected to Fellow Grade:

R. Abeyaratne, S. Adali, J. Barsom, J. Bennett, M. Hyer, E. Jordan, J. W. Ju, G. Kardomateas, S. Kyriakides, K. Liechti, K. Morman, T. Mura, O. Nwokah, J. Pan, M. Pettigrew, P. Pinsky, S. Rakheja, H. Reed, L. Thigpen, K. W. Wang, R. Whirley, I. Zeid.

Note: The AMD now has an Awards Nomination Committee, chaired by Tinsley Oden, to which all nominations for ASME and AMD honors should be sent, except for the Timoshenko, Koiter, and Drucker Medals which are handled through the AMD Executive Committee. Nominations should be sent well in advance of the IMECE.

S. A. BERGER, *Chair*

## Journal of Applied Mechanics

I wish to extend my continued gratitude to the authors, Associate Editors, and reviewers who have contributed to the success of the Journal. The backlog of papers awaiting publication in New York remains low, while the pages allocated to the Journal stand at a healthy 1200 per year. It is an excellent time for authors who are concerned by a long wait for

papers to show up in print to submit articles to the *Journal of Applied Mechanics*.

The board of Associate Editors, as ever, plays an important part in the successful operation of the *Journal of Applied Mechanics*. An Associate Editor serves for a term of three years, once renewable, plus an additional year reserved for clearing paper evaluations. R. Abeyaratne, T.R. Akylas, S.A. Berger, X. Markenscoff, S.W. Shaw, and M. Shinozuka completed their service as Associate Editors on July 1, 1997. We would like to welcome to the Editorial Board as new Associate Editors, R.C. Benson, M.M. Carroll, M.-J. Pindera, J.R. Barber, K.T. Ramesh, and C. G. Speziale.

In closing, I would like to reiterate my thanks to all who have helped to make 1997 a productive year. I look forward to maintaining the high standard of excellence expected of the *Journal* in the coming year.

LEWIS WHEELER, *Technical Editor*

## 1997 Timoshenko Medal

(continued from page 1)

his involvement. He was elected a Fellow of the Royal Society in 1992. Among the many contributions Willis has made to our profession is his taking over the reins of the *Journal of the Mechanics and Physics of Solids* at a particularly difficult time in the journal's history in 1982. He quickly returned the journal to its position as the premier technical journal in solid mechanics.

A few personal details about John Raymond Willis. John was born in England, he attended grammar school in Southall, Middlesex, and obtained his B.Sc. degree in mathematics and his PhD from Imperial College, London. After a year as a research associate at the Courant Institute in New York, Willis spent the period from 1965 to 1972 as a researcher in the Department of Applied Mathematics and Theoretical Physics at the University of Cambridge. It was during this period that he carried out much of his early work on anisotropic elasticity, interface cracks, and dislocation mechanics. In 1972 he assumed the Professorship of Applied Mathematics at the University of Bath. For most of his career, Willis has been active in the British mechanics community: organizing meetings, serving in various capacities on journal boards, as consultant to the nuclear power and aerospace industries, and as a representative to IUTAM. John returned to Cambridge in the early 1990's as the Professor of Theoretical Solid Mechanics in the Department of Applied Mathematics and Theoretical Physics. He is married, and he and his wife have three daughters.

J. HUTCHINSON

## 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

At the 1997 IMECE meeting in Dallas, TX, 25 committee members came to the technical committee meeting. During this meeting four sessions were organized. The Committee is sponsoring three symposia at the 1998 IMECE (Anaheim, CA). The first symposium is on "Scale Effects in Heterogeneous Materials," organized by Martin Ostoja-Starzewski of the Institute of Paper Science & Technology in Atlanta, Georgia. The second symposium is on "Constitutive Relations for Engineering Materials," organized by A. M. Rajendran of the U.S. Army and Research Laboratory, Aberdeen Proving Ground, Maryland, and Romesh C. Batra of Virginia Polytechnic Institute and State University, Blacksburg, Virginia. The third symposium is on "Phase Transformations and Active Composites," organized by Dimitris C. Lagoudas of Texas A. & M., College Station, Texas, and N. Bhattacharya of Caltech, Pasadena, California.

This committee is very active in organizing ASME symposia on topics related to modeling the mechanical behavior of materials.

George Z. Voyiadjis will be rotating off and Martin Ostoja-Starzewski will take the chair of this Committee effective this fall. During this Summer nominations will be solicited from the committee members for the vacant position of the vice-chair. The vice chair now serves two years and then becomes chair for three years.

GEORGE VOYIADJIS, *Chair*

### • Composites Committee

The AMD Composites Committee currently has 63 active members. As my term ends on June 30 of this year, I will be replaced by Vice-Chair Yapa Rajapakse as the chair for a term of three years. The new Vice-Chair is George Kardomateas, who was elected at the fall meeting in Dallas.

The committee continues to be active in organizing symposia, having put together one symposium at McNu '97 (Northwestern University), and two symposia at the '97 IMECE in Dallas: 1) Application of Fiber Composites in Off-Shore and Marine Technologies (organized by T.W. Chou and Y.D.S. Rajapakse); and 2) Func-

tionally Graded and Shape Memory Materials: Theoretical and Computational Models (C. Brinson and J.N. Reddy).

Three symposia have been accepted for the '98 IMECE: 1) Design and Manufacturing of Composites (honoring Nick Pagano) (A. Roy); 2) Wave-based Acoustic Emission for the Characterization of Damage Initiation (A. Mal); and 3) Damage and Durability in Heterogeneous Media (A.M. Sastry and R. Wetherhold).

Proposals for symposia dealing with the mechanics of composites are encouraged for future conferences.

DAVID H. ALLEN, *Chair*

### • Committee on Computing in Applied Mechanics

CONCAM is sponsoring three symposia at 98 IMECE:

1. Computational Methods for Solution of Inverse Problems (Olsen & Sagal)
2. Computational Methods for Analysis, Design and Simulation of MEMS (Pinsky & Aluru)
3. Computer Aided Optimization of Non-linear Industrial Problems (Saran, Noor, Kikuchi)

and is co-sponsoring

Thermal-Mechanical Effects in Manufacturing and Materials Processing, with the K-15 Committee of the Committee on Heat Transfer in Materials Processing and Manufacturing. (Chandra)

More information on these symposia and up-to-date information about CONCAM activities are available on the CONCAM web site

<http://www.sonic.net/lshwer/CONCAM/concam.html>

L. SCHWER, *Chair*

### • Elasticity Committee

The Elasticity Committee elected Dimitris Lagoudas of Texas A & M Univ. as the Vice-Chair of the committee, welcomed two new members and sponsored a Symposium, with W. T. Chen as the organizer, on Electronic Materials for the 1997 IMECE. The committee is also sponsoring a Symposium on Active Materials for the 1998 IMECE with Drs. Lagoudas and Bhattacharya as the co-organizers.

R. BATRA, *Chair*

### • Experimental Mechanics Committee

First I would like to thank Jeff Suhling our outgoing Chair for four years of excellent service to the committee and ASME. He continues to help out in the transition.

With twenty people in attendance at its meeting at the 97 IMECE, we can be encouraged about the well being of the committee. The main items of business at this meeting consisted of setting up symposia for future meetings.

It was proposed that the following symposia be included in the program for the 1998 IMECE:

“Micro-electronic Sensors,” (to be co-sponsored by the Electrical and Electronic Packaging Division) composed of four sessions to be organized by J. Suhling.

“Micromechanical Measurements,” composed of three sessions to be organized by W. Knauss and K. Liechti.

“Failure Characterization of Interfaces and Functionally Graded Materials” (to be co-sponsored by the Fracture Committee) composed of four sessions to be organized by H. Tippur.

Subsequently we have received word that four sessions have been approved (one each for the first two and two for the third).

The next committee meeting will be held at the 1998 IMECE. Current and prospective members are encouraged to attend.

KENNETH LIECHTI, *Chair*

#### • Fluid Mechanics Committee

Our activities in the past year have included sponsoring the following symposia at the 1997 IMECE.

- (1) “Gas Liquid Flows in Fluid Mechanics and Heat Transfer” — which consisted of 4 sessions jointly sponsored by AMD, HTD, and FED. AMD sponsored 2 sessions. The organizers were A. Narain, from Michigan Technological University; S. G. Kandilakar, from RIT; and U. S. Rohatgi, from Brookhaven Nat. Lab. These were very well attended. The proceedings papers appear in the FED-Vol. 244.
- (2) “Fluid-Structure Interactions, Aeroelasticity, Flow Induced Vibrations and Noise” — which consisted of 34 sessions, jointly sponsored by AMD, FED, HTD, NCA, NE, PVP and AD. AMD sponsored 2 sessions on “Numerical Methods in Fluid-Structure Interactions.” The general organizer was M. P. Paidoussis, from McGill University, and the AMD session organizers were T. C. Corke and D. R. Williams, from the Illinois Institute of Technology. The AMD sessions were extremely well attended (in excess of 80 in the audience). The proceedings papers appear in the AD-Vol 53-1.

The Committee also elected a new Vice-Chair, Amitabh Narain, from the Michigan Technical University. Finally, the Committee welcomes nominations for all ASME awards and honors for contributions in fluid mechanics, and any suggestions for future symposia at AMD Summer Conferences and IMECEs.

THOMAS C. CORKE, *Chair*

#### • Committee on Instability in Solids and Structures

The Committee organized two symposia for the Joint AMD/MD summer meeting McNU97. Eleven papers were presented in the symposium Constitutive Models for Rocks and their Influence on Stability Predictions, organized by J. Labuz, Y. Leroy, J. Rudnicki and N. Triantafyllidis. Eight papers were presented in a second symposium organized by E. Corona and S. Kyriakides entitled Plastic Buckling

The Committee also participated with a two session symposium at the 1997 IMECE. The symposium was entitled Instability in Nonlinear Microstructured Media and was co-organized by S. Kyriakides, P. Ponte-Castaneda and N. Triantafyllidis. In both the Evanston and Dallas meetings, we had the pleasure of having a large number of colleagues from overseas giving presentations, most of which had made the trip just to participate at the conference. This is a reassuring sign for the importance of the ASME summer and winter meetings in the eyes of the international community.

We participated in two symposia in the 1998 Thirteenth US National Congress of Applied Mechanics, which was held at the University of Florida in Gainesville from June 21 – 26. The first was a four session symposium entitled Nonlinear Mechanics of Composites, co-organized by S. Kyriakides and Y. Rajapakse and the second was a two session symposium entitled Stability Problems in Thermoelastic and Frictional Contact, organized by N. Triantafyllidis. We also plan to participate in two symposia at the 98 IMECE.

During both the winter and summer ASME meetings, our technical committee meets to plan for our future activities and to encourage participation from national and international researchers in the field. Those interested in our activities are welcomed in our TC meetings and are also encouraged to contact the committee chair at any time to share their ideas and volunteer their help.

We have some more good news to share about the recently established W. T. Koiter Medal, which will be awarded annually, by the ASME. The first medal went to Prof. Koiter himself, to acknowledge his seminal lifetime contributions in Solid Mechanics. The second Koiter Medal will be awarded to Prof. Viggo Tvergaard, of the Solid Mechanics Department of the Technical University of Denmark in Lyngby. Prof. Tvergaard is a worthy continuator of the school of thought established by the late Prof. Koiter and a significant portion of his work involves applications of stability theory to a very wide class of problems in solid mechanics. Our TC applauds this well deserved award and hopes that it will

further promote the long tradition of excellence our field.

NICOLAS TRIANTAFYLLIDIS, *Chair*

#### • Mechanics Education Committee.

At the 1997 IMECE, the Committee sponsored a symposium entitled “Mechanics in a Restructured Engineering Curriculum”. Organized by Dimitris Lagoudas, the two-session symposium dealt with mechanics education in the National Science Foundation’s Coalitions Program. Papers were given by presenters from NSF and from Texas A&M, Rensselaer Polytechnic and Carnegie Mellon Universities. As with the committee’s symposium at the 1996 IMECE, the proceedings of Dimitris’ symposium has been put on the Web; check the AMD web page <http://www.asme.org/divisions/amd>. Currently taking shape for the 1998 IMECE is a second two-session symposium on the 1997 theme (again organized by Dimitris), with presenters from Northwestern, PennState and perhaps other institutions. In July, George Johnson will take the helm of the MechEd Committee, so look for even bigger and better things to come.

THOMAS L. GEERS, *Chair*

#### • Transportation Committee

Our symposia “The Crashworthiness, Occupant Protection and Biomechanics in Transportation Systems” held at the 1997 IMECE was very successful. We had 5 sessions:

1. Vehicle Crashworthiness
2. Components Modeling for Crashworthiness
3. Guardrail, Composite and Collision Avoidance Simulation
4. Future Technologies/Systems and Occupant Protection and Biomechanics (two sessions)

We had a total of 24 papers from both industry and academia. Papers were submitted by authors from the U.S, Europe and India. We had an attendance of 20-30 people per session in the first three and about 70 people per session in the fourth and fifth ones. This attendance is about twice as high as what we had in Atlanta in 1996. The five sessions were chaired by Dusan Kecman, Majeed Bhatti, John Reid, Saeed Barbat and Adnan Nayfeh respectively.

HIKMAT MAHMOOD, *Chair*

## World Wide Web URLs

A copy of this Newsletter may now be accessed electronically through the Applied Mechanics Division homepage. We welcome your feedback and suggestions on how the web-version of the newsletter can best be structured to suit your needs.

Contact information for AMD Executive Committee members and Technical Committee chairs can be found on the AMD homepage.

### ASME Homepage

<http://www.asme.org>

### Applied Mechanics Division

<http://www.asme.org/divisions/amd/index.html>

## Applied Mechanics Division

### Executive Committee 1997-1998

*Chair*  
Professor Stanley A. Berger  
University of California  
510-642-5950  
saberger@me.berkeley.edu

*Vice Chair & Publications  
Committee Chair*  
Professor Lallit Anand  
Massachusetts Institute of  
Technology  
617-253-1635  
lallit@mit.edu

*Program Committee Chair*  
Professor Alan Needleman  
Brown University  
(401) 863-2863  
needle@engin.brown.edu

*Program Committee Vice Chair*  
Professor Thomas J. R. Hughes  
Stanford University  
(650) 723-2040  
hughes@am-sun2.stanford.edu

*Secretary*  
Professor Dusan Krajcinovic  
Arizona State University  
(602) 965-8656  
dusan@asu.edu

### Technical Committee Chairs

*AMD-MD Joint Committee on  
Constitutive Equations*  
Professor George Z. Voyiadjis  
Louisiana State University  
(504) 388-8668  
cegzv1@unix1.sncc.lsu.edu

*Composite Materials*  
Professor David H. Allen  
Texas A&M University  
(409) 845-1669  
dhallen@aero.tamu.edu

*Computing in Applied Mechanics*  
Dr. Len Schwer  
Schwer Engineering &  
Consulting Services  
(707) 541-3906  
Lschwer@sonic.net

*Dynamics and Control of  
Structures and Systems*  
Professor Anil K. Bajaj  
Purdue University  
(317) 494-6896  
bajaj@ecn.purdue.edu

*Elasticity*  
Professor Romesh C. Batra  
Virginia Polytechnic Institute  
(540) 231-6051  
rbatra@vt.edu

*Experimental Mechanics*  
Professor Kenneth Liechti  
University of Texas  
(512) 471-4164  
kml@mail.utexas.edu

*Fluid Mechanics*  
Professor Thomas C. Corke  
Illinois Institute of Technology  
(312) 567-3184  
corke@mae.iit.edu

*Fracture Mechanics*  
Professor G. Ravichandran  
California Institute of  
Technology  
(818) 395-4525  
ravi@caltech.edu

*Geomechanics*  
Professor Ching S. Chang  
University of Massachusetts  
(413) 545-5401  
chang@ecs.umass.edu

*Instability in Solids and  
Structures*  
Professor Nicolas  
Triantafyllidis  
University of Michigan  
(313) 763-2356  
nick@srvr5.engin.umich.edu

*Materials Processing and  
Manufacturing*  
Professor Tess J. Moon  
University of Texas  
(512) 471-0094  
tmoon@mail.utexas.edu

*Mechanics Education*  
Professor Thomas L. Geers  
University of Colorado  
(303) 492-6355  
geers@spot.colorado.edu

*Transportation*  
Dr. Hikmat F. Mahmood  
Ford Motor Company  
(313) 594-2300  
mahmood@alp558.srl.ford.com

*Wave Propagation*  
Professor Stanislav I. Rokhlin  
Ohio State University  
(614) 459-7785  
Rokhlin.2@osu.edu

### Administrative Committees

*Representatives to the Operating  
Board*  
C. T. Herakovich  
S. A. Berger

*Recording Secretary of the  
Executive Committee*  
Prof. Panos Papadopoulos  
University of California,  
Berkeley  
(510) 642-3358  
panos@euler.berkeley.edu

*Recording Secretary of the  
General Committee*  
Prof. Sanjay Govindjee  
University of California,  
Berkeley  
(510) 642-6060  
sanjay@ce.berkeley.edu

*Honors Committee*  
S. A. Berger, Chair  
*Awards Nomination Committee*  
J. Tinsley Oden, Chair  
University of Texas  
(512) 471-3312  
oden@ticam.utexas.edu

*Timoshenko, Koiter, Drucker  
Medal Committee*  
S. A. Berger, Chair

*U.S. National Committee on  
Theoretical and Applied  
Mechanics*  
C. T. Herakovich

### Editorial Board

*Technical Editor*  
Journal of Applied Mechanics  
Professor Lewis T. Wheeler  
University of Houston  
(713) 743-4519

*Editor-in-Chief*  
Applied Mechanics Reviews  
Professor Arthur W. Leissa  
Ohio State University  
(614) 292-2680

*Editor*  
Applied Mechanics Newsletter  
Professor Lori Graham  
University of Virginia  
(804) 924-3930  
graham@virginia.edu

*ASME Staff / AMD Technical  
Administrator*  
A.J. Majewski  
(212) 591-7284  
majewskia@asme.org

## Future Meetings

**1998 IMECE (ASME, Winter Annual Meeting)  
November 15–20, 1998.** The following symposia will be sponsored by the Applied Mechanics Division at the 1998 IMECE (Winter Annual Meeting of ASME), November, Anaheim Hilton & Towers, Anaheim California, AMD program chair: Professor Thomas Hughes at [hughes@am-sun2.stanford.edu](mailto:hughes@am-sun2.stanford.edu)

Please contact the individual organizer for more information on the individual symposia. For brevity, only one of the organizers for each symposium is listed as the point of contact.

*Computing Methods for Solution of Inverse Problems in  
Mechanics*, L. Olson, [lolson@unlinfo.unl.edu](mailto:lolson@unlinfo.unl.edu), 402  
472 5082

*Constitutive Relations for Engineering Materials*, A.  
Rajendran, 410-306-0800

*Phase Transformations and Active Composites*, D.  
Lagoudas, [lagoudis@aero.tamu.edu](mailto:lagoudis@aero.tamu.edu)

*Miromechanics and Laminate Analysis: A Symposium in  
Honor of Dr. N. Pagano's 65th Birthday*, A. Roy,  
[royak@ml.wpafb.af.mil](mailto:royak@ml.wpafb.af.mil), 937 255 9104

*Crashworthiness, Occupant Protection and Biomechanics  
in Transportation*, H. Mahmood, [mahmood@alp558.srl.ford.com](mailto:mahmood@alp558.srl.ford.com), 313 594 2300

*Stability in Solids and Structures*, S. Kyriakides,  
[skk@mail.utexas.edu](mailto:skk@mail.utexas.edu), 512 471 4176

*Micromechanical Failure in Composites*, A. Waas,  
[dcw@caen.engin.umich.edu](mailto:dcw@caen.engin.umich.edu), 734 764 8227

*Acoustic Microscopy for Material Characterization*,  
T. Kundu, [tkundu@u.arizona.edu](mailto:tkundu@u.arizona.edu), 520 621 6573

*Shock Waves, Dynamic Failure and Phase Transformation  
in Solids*, K.T. Ramesh, [ramesh@jhu.edu](mailto:ramesh@jhu.edu)

*Computational Methods for Analysis, Design and Simula-  
tion of MEMS*, P. Pinsky, [pinsky@ce.stanford.edu](mailto:pinsky@ce.stanford.edu),  
415 723 9327

*Computer Simulation/Optimization of Industrial Process-  
es*, M. J. Saran, [mjs7@po.cwru.edu](mailto:mjs7@po.cwru.edu), 216 368 6485

*Failure Characterization of Interfaces and Functionally  
Graded Materials*, H. Tippur, [htippur@eng.auburn.edu](mailto:htippur@eng.auburn.edu), 334 844 3327

*Micromechanics Measurements*, W.G. Knauss,  
[wgk@atlantis.caltech.edu](mailto:wgk@atlantis.caltech.edu), 626 395 4524

*Scale Effects in Heterogeneous Materials*, M. Ostoja-  
Starzewski, [martin.ostoja@ipst.edu](mailto:martin.ostoja@ipst.edu), 404 894 6646

*Innovative Computational Methods Applied to Linear  
Structural Mechanics*, A.J. Kalinowski, 860-440-4728

*Innovations in Industrial Actuator Design*, F.  
Golnaraghi, [mfgolnar@xiphoid.uwaterloo.ca](mailto:mfgolnar@xiphoid.uwaterloo.ca),  
519 885 4753

*Mechanics in a Restructured Engineering Curriculum*,  
D. Lagoudas, [lagoudis@aero.tamu.edu](mailto:lagoudis@aero.tamu.edu)

*Role of Novel Experimental Methods in Understanding the  
Fracture and Failure of Solids*, W. Chen, [chenwt@endvm5.vnet.ibm.com](mailto:chenwt@endvm5.vnet.ibm.com), 607 757 1320

*Emerging Topics in Fracture and Failure*, H. Gao, [gao@ecs.umass.edu](mailto:gao@ecs.umass.edu), 413 545 0868

*Durability and Damage Tolerance of Heterogeneous Mate-  
rials*, A.M. Sastry, [amsastry@engin.umich.edu](mailto:amsastry@engin.umich.edu),  
313 764 3061

**ASME Mechanics and Materials Conference  
1999**, June 27 – 30, Virginia Polytechnic Institute  
and State University, Blacksburg Virginia  
Co-chair R. C. Batra, [rbatra@vt.edu](mailto:rbatra@vt.edu), online infor-  
mation is available at the website <http://www.esm.vt.edu/mmconf/>

**ASME International Mechanical Engineering  
Congress and Exposition 1999**, November 14 –  
19, 1999, Nashville Tennessee

**Summer 2000: IUTAM International Congress  
on Theoretical and Applied Mechanics**, August  
27 – September 2, 2000, Chicago Illinois  
Chair: Hassen Aref, [www.tam.uiuc.edu/ICTAM2000](http://www.tam.uiuc.edu/ICTAM2000)

**ASME International Mechanical Engineering  
Congress and Exposition 2000**, November 5–10,  
2000, Orlando Florida

**Procedures for Requesting AMD-Sponsored  
Sessions at IMECE's or Summer Meetings.** See  
the AMD homepage (URL <http://www.asme.org/divisions/amd/index.html>). The next round  
of requests should be made to Professor Dusan  
Krajcinovic at [dusan@asu.edu](mailto:dusan@asu.edu) for the 1999 IMECE  
(WAM) to be held in Nashville.

A time-saving solution to your Information needs ...

# APPLIED MECHANICS REVIEWS JOURNAL LITERATURE ON CD-ROM



(Windows format)

The AMR CD will help you keep on top of the latest published journal literature with these time-saving features:

- quick, easy access to over 100,000 classified journal article abstracts
- search capabilities by title, author, source journal, classification, author affiliation, keyword and more
- narrowed searches that produce more on-target "hits" than any competition

Containing over 100,000 citations from AMR's journal literature section, which draws from some 450 international journals, the AMR CD-ROM is the ultimate tool for accessing engineering literature. The nine years of engineering literature (1989-1997) on the CD is easily searchable using convenient custom-designed query templates or Boolean commands for quick searches.

The product offers users the capability of creating a Shadow File in which they can save their search result notes on diskette for later use with the CD. An extensive Help File offers users instant answers to their "How to" questions.

## AMR MONTHLY JOURNAL

Each monthly journal issue of AMR contains approximately 1,600 article abstracts in mechanics and related fields from 450 research journals worldwide. All abstracts are arranged by a comprehensive subject classification scheme with extensive cross-indexing.

In addition, AMR editors select acclaimed experts to contribute book reviews — about 15 per issue. A separate annual Index, which lists all abstracts and book reviews, is organized by subject, author, and alphabetical keyword.

AMR CD-ROM (ISSN: 1088-8535), \$675

AMR Print Journal (ISSN: 0003-6900), \$624

AMR CD-ROM and Print Journal, \$995



[www.asme.org/pubs/amr/index.htm](http://www.asme.org/pubs/amr/index.htm)

## TO ORDER

### Mail:

ASME, 22 Law Drive, Box  
2900, Fairfield, NJ 07007-2900

### Phone:

U.S. and Canada: 800-843-2763

Mexico: 95-800-843-2763

Outside No. America: 973-882-1167

Fax: 973-882-1717

E-mail: [infocentral@asme.org](mailto:infocentral@asme.org)