



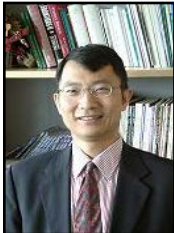
# Applied Mechanics Division 2012 Newsletter

Applied Mechanics Executive Committee  
(2011-2012)

## Applied Mechanics Division 2011-2012 Executive Committee



**Vice-Chair**  
Kenneth M. Liechti



**Program Vice-Chair**  
Huajian Gao



**Chair**  
Ares J. Rosakis



**Program Chair**  
Lawrence Bergman



**Secretary**  
Peter Wriggers

### *Message from the Chair*

My formal service on the Executive Committee of the American Society of Mechanical Engineers (ASME) Applied Mechanics Division (AMD) has come to an end. I have served as Chair of the Division from 2011-2012 and as a committee member for the past five years. It has been an amazing five years. During my term I have had the opportunity to work with an exceptional group of mechanicians who volunteer their time to serve on this committee. I was very lucky to have been able to follow in the footsteps of one of the most dedicated and knowledgeable committee members I know, Tayfun Tezduyar, Rice University. Tayfun is the sage of everything AMD. All my committee members, Ken Liechti (*Vice-Chair*) of University of Texas, Larry Bergman (*Program Chair*), University of Illinois at

Urbana-Champaign, Huajian Gao (*Program Vice-Chair*) Brown University and Peters Wriggers (*Secretary*) Leibniz Universität Hannover, have made this a great journey.

As I leave the committee I would like to welcome in our newest incoming Executive Committee member, Arun Shukla of the University of Rhode Island. Arun's qualifications will make him an excellent addition to this committee.

The AMD Division is governed by the Executive Committee that is made up of 5 members. One new member is appointed each year for a term of five years. Each member of the Executive Committee serves as the Secretary of the Division during the first year of appointment, as Vice-Chair of the Program Committee during the second year of appointment, as Chair of the Program Committee during the third year of appointment, as Vice-Chair of the Division and Chair of the Publications Committee during the fourth year of appointment, and as Chair of the Division and Chair of the Timoshenko, Koiter, Drucker, Caughey, Belytschko and Hughes Medal/Award Committees during the final year of appointment.

The overall aims of the Division, as stated in the AMD bylaws is *"to foster the intelligent use of mechanics by engineers and to develop this science to serve the needs of engineering. Mechanics is construed to include fundamental analytical and experimental studies in the fields of biomechanics, composite materials, computing methods, dynamics, elasticity, experimental methods, fracture, geomechanics, hydrodynamics, lubrication, fluid dynamics, mechanical properties of materials, micromechanics, plasticity and failure, plates and shells, wave propagation and related fields... the Applied Mechanics Division is not primarily concerned with design data, but with methods and approaches that yield a new level of understanding and which may provide the basis for new design information."*

The Applied Mechanics Division of the ASME is not only one of the oldest (*founded in 1927*) but, is also the largest division of the six divisions that make up the ASME Basic Engineering Group. These divisions are: Applied Mechanics (4958), Bioengineering (1,983), Fluids Engineering (2902), Heat Transfer (3,303), Materials (1,832) and Tribology (463).

The ASME 2011 International Mechanical Engineering Congress and Exposition (IMECE) was held in November 2011 in Denver, Colorado. Every year the AMD conference track, **Mechanics of Solids, Structures and Fluids** has done exceptionally well. The 2011-Track 12, chaired by Larry Bergman and vice-chair Huajian Gao, was a great success with 29 symposia and about 400 presentations. Also, the upcoming 2012, chaired by Huajian Gao and vice-chair Peter Wriggers will be no exception, in fact, it may be one of the most successful conferences we have ever had. This success is due to the dedication and hard work of all involved.

Highlights, of 2011 ASME-IMECE Track-12, were the plenary lectures which were delivered by **Ken Chong**, George Washington University, Washington, DC. Ken spoke on *"Nuclear Energy: Safety, Production, Mechanics Research and Challenges"* and **David Gartling**, Sandia National Laboratory, Albuquerque, NM who spoke on *"A Finite Element Method for Ablation Problems"*.

The 2011 Daniel C. Drucker Medalist, **John Rudnicki**, Northwestern University spoke on *"Formation and Extension of Localized Compaction in Porous Sandstones"*.

The 2011 Warner T. Koiter Medalist, **James G. Simmonds**, The University of Virginia spoke on *"The Simple Logic of Classical Nonlinear Thermodynamic Shell Theory"*.

## 2011 ASME Applied Mechanics Division (AMD) Annual Honors and Awards Banquet

Every year in November I look forward to the Annual ASME AMD Honors and Awards Banquet, this last year it was held in Denver, Colorado, and I had the pleasure of presiding over this very special evening. This was the most memorable event of my term as AMD Chair. We, mechanics, come together to spend a few fantastic hours where we visit with our colleagues and friends from around the world and honor many of them for their contributions in our field of mechanics. I had the pleasure of presenting the ASME-AMD Division and Society awards, the AMD Student Paper Competition awards, the AMD-Haythornthwaite Foundation Travel Awards and thanks to the generosity of the Robert M and Mary Haythornthwaite Foundation this year we had a new award to give, the 2011 AMD-Haythornthwaite Research Initiation Grants Awards. Below are the awards presented at the AMD Honors and Awards Banquet in November 2011.

### 2011 ASME-AMD Division Awards:

#### **Thomas J. R. Hughes Young Investigator Award:**

*This year we gave out two Young Investigator Awards. This award was established in 1998 and renamed the Thomas J.R. Hughes Young Investigator Award in 2008. The Award recognizes special achievements in Applied Mechanics for researchers under the age of forty. The recipients of these awards were:*

- ❖ **Markus Buehler** (*Massachusetts Institute of Technology*)  
*Received for exceptional contributions in computational mechanics of biological materials and structures, focused on deformation and failure in the context of both normal physiological, mechanically extreme and disease states through the utilization of atomistic, molecular, coarse-grained and continuum methods*
- ❖ **Ioannis Chasiotis** (*University of Illinois at Urbana Champaign*)  
*Received in recognition of outstanding contributions to the understanding of the mechanics of fracture of polycrystalline and nanocrystalline thin films, and the time dependent mechanics of nanoscale polymeric fibers with pioneering full-field experimental methods based on Atomic Force Microscopy and MEMS.*

#### **Ted Belytschko Applied Mechanics Award:**

*This year we also gave out two awards for the Applied Mechanics Award which was established in 1988 and renamed the Ted Belytschko Applied Mechanics Award in 2008. The Award is given to an outstanding individual for significant contributions in the practice of engineering mechanics; contributions may result from innovation, research, design, leadership or education. The recipients of these awards were:*

- ❖ **Ken P. Chong** (*National Science Foundation*)  
*In recognition of his role as an educator, a journal editor and promoter of Mechanics, particularly in emerging areas.*
- ❖ **David K. Gartling** (*Sandia National Laboratories*)  
*For his internationally regarded contributions to computational mechanics and pioneering developments in the application of the finite element method to fluid dynamics*

#### **Thomas K. Caughey Dynamics Award:**

*The Thomas K. Caughey Dynamics Award was established in 2008 and is conferred in recognition of an individual who has made significant contributions to the field of nonlinear dynamics through practice, research, teaching, and/or outstanding leadership. This award was given to:*

❖ **Philip Holmes** (*Princeton University*)

*In recognition of his scholarly work in Nonlinear Dynamics and Vibrations. His work revolutionized engineering nonlinear dynamics and vibrations, bridging the gap between Applied Mathematics and Engineering through the application of powerful concepts and methodologies of nonlinear dynamics to engineering practice.*

## **2011 ASME-Society Awards:**

### **Daniel C. Drucker Medal:**

*The Daniel C. Drucker Medal was established in 1997 and is conferred in recognition of distinguished contributions to the field of applied mechanics and mechanical engineering through research, teaching and service to the community over a substantial period of time. This year was given to:*

❖ **John W. Rudnicki** (*Northwestern University*)

*For providing a new fundamental understanding of deformation instabilities in brittle rocks and granular media, including their interactions with pore fluids, with applications to fault instability, quantification of energy radiation from earthquakes, and environment and resource-related geomechanics.*

### **Warner T. Koiter Medal:**

*The Warner T. Koiter Medal, established in 1996, is bestowed in recognition of distinguished contributions to the field of solid mechanics with special emphasis on the effective blending of theoretical and applied elements of the discipline, and on a high degree of leadership in the international solid mechanics community. Given this year to:*

❖ **James G. Simmonds** (*University of Virginia*)

*For rigorous, seminal contributions to linear and nonlinear theories in solid mechanics with special emphasis on plates and shells; for an extensive body of journal publications and books on solid mechanics and applied mathematics.*

### **Timoshenko Medal:**

*The Timoshenko Medal was established in 1957 and is conferred in recognition of distinguished contributions to the field of applied mechanics. Instituted by the Applied Mechanics Division, it honors Stephen P. Timoshenko, world-renowned authority in the field, and it commemorates his contributions as author and teacher. Received this year by:*

❖ **Alan Needleman** (*University of North Texas*)

*For seminal contributions to the understanding of inelastic deformation and failure of materials.*

## **Fellow of ASME:**

This year I had the pleasure of presenting an additional award at the AMD Banquet. I was honored to present **Fu-Pen Chiang** (*Stony Brook University*) with his Fellowship Certificate for being elected Fellow of ASME. The ASME confers the Fellow grade of membership on worthy candidates to recognize their outstanding engineering achievements. Fu-Pen is truly deserving of this prestigious honor and I was happy to be a part of this.

## Haythornthwaite Foundation:

As I mentioned The Robert M. and Mary Haythornthwaite Foundation has been a generous supporter of the Applied Mechanics Division. They support scientific research, primarily research in the field of Theoretical and Applied Mechanics. The Foundation now sponsors the three AMD award categories below.

### **The 2011 AMD-Haythornthwaite Research Initiation Grants Awards:**

This past year the Applied Mechanics Division, through the generosity the Haythornthwaite Foundation, agreed to sponsor a new divisional award, the **Haythornthwaite Research Initiation Grant**. This new grant targets university faculty that are at the beginning of their academic careers engaged in research in theoretical and applied mechanics. I am glad to say we were able to fully fund three grants. The three recipients of the 2011 grants were:

- ❖ **Christian Franck** (*Brown University*) *"Custom-designed Uniaxial Compression Device for Measuring the Mechanical Response of Soft Biomaterials"*
- ❖ **Dennis Kochmann** (*California Institute of Technology*) *"A Unique Test Device for Viscoelastic Spectroscopy of Composites Containing Piezoelectric Constituents"*
- ❖ **Xuanhe Zhao** (*Duke University*) *"Electro-Chemo-Mechanics of Silicon Electrodes in Lithium-Ion Batteries"*

**Exciting news!** The Haythornthwaite Foundation has very generously agreed to increase the amount of their donation for these research initiation grants. And AMD will also generously match a portion of this contribution to increase the number/amount of initiation grant awards.

### **The 2011 AMD-Haythornthwaite Foundation Student Travel Award:**

The Applied Mechanics Division, Executive Committee continues to seek ways to involve and encourage younger members and particularly graduate students in the activities of the AMD Division.

Through the annual support of The Robert M. and Mary Haythornthwaite Foundation six travel grants were awarded in 2011. These travel grants are offered to U.S. graduate students currently enrolled at U.S. universities or colleges presenting a paper in any field of applied mechanics. The winning papers will be presented at the 2012 International Mechanical Engineering Congress and Exhibition (IMECE) in the upcoming conference in Houston, TX. The 2011 winners were:

- ❖ **Baptiste Coudrillier** – (*Johns Hopkins University*) *"Effect of the Scleral Collagen Structure on the Mechanical Response of the Optic Nerve Head"*
- ❖ **Qi (Kevin) Ge** – (*University of Colorado*) *"Thermo-mechanical Behaviors of Shape Memory Elastomer Composites"*
- ❖ **Zheng Jia** – (*University of Maryland*) *"In situ Experiments and Mechanics modeling of Tensile Cracking in Indium Tin Oxide Thin Films on Polyimide Substrates"*
- ❖ **Theresa M. Koys** – (*Johns Hopkins University*) *"A Thin Shell Inflation Method for the Anisotropic Properties of Human Skin Tissues"*

- ❖ **Shuodao Wang** – (*Northwestern University*) “*Mechanics of Curvilinear Electronic*”
- ❖ **Qiming Wang** – (*Duke University*) “*Creasing to Cratering Instability in Polymers under Electric Fields*”

### **The 2011 Applied Mechanics Division (AMD) Student Paper Contest Winners:**

The Applied Mechanics Division encourages the involvement of graduate students in the activities of the AMD Division. One of the ways is the sponsorship of the annual Student Paper Contest. The recipients of this prize are chosen from the Haythornthwaite Student Travel contest award pool sponsored by the Haythornthwaite Foundation. The 2011 winners were:

- ❖ **1<sup>st</sup> Place prize: Baptiste Coudrillier** – (*Johns Hopkins University*)  
*Effect of the Scleral Collagen Structure on the Mechanical Response of the Optic Nerve Head*
- ❖ **2<sup>nd</sup> Place prize: Qiming Wang** – (*Duke University*)  
*Creasing to Cratering Instability in Polymers under Electric Fields*
- ❖ **3<sup>rd</sup> Place prize: Shuodao Wang** – (*Northwestern University*)  
*Mechanics of Curvilinear Electronics*

### **Journal of Applied Mechanics:**

The AMD Journal of Applied Mechanics (JAM) thanks outgoing Editor, Robert McMeeking (*University of California, Santa Barbara*) we are very grateful for his excellent leadership, service and dedication he provided during his two (5-year) terms as Editor of JAM. Bob was presented with his certificate of service, which will end on July 1, 2012, and at the same time we welcomed in the incoming Editor – Yonggang Huang (*Northwestern University*). For the calendar year 2010 there were 130 papers technical papers published and for the fiscal year 2011 which is from July 1, 2010 until June 30, 2011 there were approximately 136 papers.

### **Applied Mechanics Review:**

The AMD-Applied Mechanics Review (AMR) thanks outgoing AMR Editor, JN Reddy (*Texas A&M University*) for his superb service during his term as Editor and for his outstanding performance. We also welcomed in the 2012 incoming Editor, Harry Dankowicz (*University of Illinois at Urbana-Champaign*) whose term began on January 1, 2012.

### **Special Mention:**

Also, I would like to mention several other members of the ASME-AMD team that are responsible for pulling this all together every year. **Yuri, Bazilevs** (*University of California, San Diego*) has been serving as the Recording Secretary for the AMD Executive Committee and has done a fantastic job. **Ioannis Chasiotis** (*University of Illinois*) has been serving as the Editor of this newsletter and produces an excellent informative edition yearly. **Jacinta McComie** (*ASME Headquarters*) for many years has been providing support to the AMD and dealing with each of us as we transition to our new duties. She takes care of the AMD Honors and Awards Banquet, the brochure and the medals. **Stacey Cooper**, (*ASME Headquarters*) provides support with the IMECE congress organization and web tools.

## Looking forward – The 2012 ASME-IMECE in Houston, Texas

I am looking forward to seeing everyone in November 2012 at the ASME International Mechanical Engineering Congress and Exposition, to be held in Houston, Texas November 9-15, 2012. It is going to be a VERY special ASME meeting where a lot of the super stars of mechanics will be honored on both Monday, November 12<sup>th</sup> and Tuesday, November 13<sup>th</sup>. Here are some of the individuals that will be honored in November 2012.

**Subra Suresh** (*Director, National Science Foundation*) - the Timoshenko Medal.

**Zdenek Bazant** (*Northwestern University*) – 2012 ASME Honorary Member.

**Jan Achenbach** (*Northwestern University*) - the 2012 ASME Medal.

**Zhigang Suo** (*Harvard University*) - the 2012 Thurston Lecturer.

**Wei Yang** (*President of the Zhejiang University*) - the 2012 Calvin W. Rice Lecture Award.

**Pol Spanos** (*Rice University*) - 2012 Richards Medal.

## During the Applied Mechanics Division's Honors and Awards Banquet:

**Subra Suresh** (*National Science Foundation*) - Timoshenko Award Lecture.

**Jim Dally** (*University of Maryland*) - the Daniel C. Drucker Medal.

**Erik van der Giessen** (*University of Groningen*) - the Warner T. Koiter Medal.

**Frank Moon** (*Cornell Univ.*) - the Thomas K. Caughey Dynamics Award.

**David Benson** (*Univ. of California, San Diego*) - the Ted Belytschko Applied Mechanics Award.

**Kenji Takizawa** (*Waseda University*) - the Thomas J. R. Hughes Young Investigator Awards.

**Xi Chen** (*Columbia University*) - the Thomas J. R. Hughes Young Investigator Awards.

**Yuri Bazilevs** (*Univ. of California, San Diego*) - Thomas J. R. Hughes Young Investigator Awards.

## iMechanica

Please don't forget to frequent and post everything mechanics on **iMechanica**. This is an excellent source for all the great things that are happening in the mechanics community.

Ares J. Rosakis, **2011- 2012**

*Chair, Applied Mechanics Division*