



Applied Mechanics Division

Newsletter 2016

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Dennis M. Kochmann,
Newsletter Editor

Applied Mechanics Division 2015-2016 Executive Committee



Arun Shukla
Vice-Chair



Pradeep Sharma
Program Chair



Peter Wriggers
Chair



Balakumar Balachandran
Program Vice-Chair



Yonggang Huang
Secretary

Message from the Chair

It was a great challenge but also a great pleasure to serve on the Executive Committee (EC) of the Applied Mechanics Division of ASME in the role of Program Vice-Chair, Program Chair, Vice-Chair, and finally to Chair during the last five years. Now my term as Chair has come to the end and I can look back to a fruitful collaboration with an outstanding group of colleagues. These include past Chairs *Tayfun Tezduyar*, *Ares Rosakis*, *Ken Liechti*, *Larry Bergman*, *Huajian Gao* and current members *Arun Shukla* (Vice-Chair), *Pradeep Sharma* (Program Chair), *Balakumar (Bala) Balachandran* (Program Vice-Chair) and *Yonggang Huang* (Secretary). I like to thank each of them for their continuous help and support during my term as Chair and for their distinguished service to the community. As of July 1, Arun Shukla becomes the new Chair, and *Yuri Bazilevs* joins the EC as the new Secretary. *Dennis Kochmann* has completed his three years as the Recording Secretary of AMD and followed *Yuri Bazilevs* as the new AMD Newsletter Editor, while *Pedro Reis* joined the EC as the new Recording Secretary.

In the next years there will be necessary adjustments related to the way of how AMD is financially handled. This is due to ASME's major reorganization throughout the Society. Thus the EC experiences challenges in the years to come. Nevertheless, the EC has pushed the Division's interests and goals with dedication within ASME on Division finances, conference organization, journal oversight (JAM and AMR) and awards maintenance. Among this is also the continuation of

the generous support by the Haythornthwaite foundation sponsoring Research Initiation Grants and Graduate Student Travel Awards. Here I like to quote Jennifer Haythornthwaite from her last mail: *"I must say that I have enjoyed tremendously this productive collaboration between the Foundation and AMD! And thank you for your stewardship of the ASME support. I have no plans to stop funding these awards for the next few years at least – it seems like one of our best investments."*

IMECE 2015

IMECE 2015 was held in Houston, Texas, from November 13-19, 2015. Pradeep Sharma and Bala Balachandran were the Chair and Vice-Chair, respectively, of Track 12, Mechanics of Solids, Structures and Fluids, the traditional forum for AMD, which had a total of 515 accepted abstracts to be presented in 38 minisymposia. The Medalists' session included presentations by the Daniel C. Drucker medalist, **Krishnaswamy Ravi-Chandar** ("Multi-scale Investigation of Deformation and Failure in Ductile Materials"), the Ted Belytschko Applied Mechanics Award recipient, **J. R. Barber** ("Shakedown and Limit Cycles for Frictional Elastic Systems"), and the Thomas K. Caughey Dynamics Award recipient, **Gabor Stepan** ("Where the Rubber Meets the Road"). The Warner T. Koiter Lecture was delivered by **Kaushik Bhattacharya** ("Slender structures of active materials").

The Applied Mechanics Division's annual Honors and Awards Banquet and Ceremony on Tuesday night was well attended. A highlight of the evening was **Michael Ortiz'** Timoshenko Medal acceptance speech. Others receiving Society-level awards included Kaushik Bhattacharya, the Warner T. Koiter Medalist, and Krishnaswamy Ravi-Chandar, the Daniel C. Drucker Medalist. Those receiving Division-level awards were Gabor Stepan, the Thomas K. Caughey Awardee; J. R. Barber, the Ted Belytschko Applied Mechanics Awardee; and **Thao (Vicky) Nguyen**, the Thomas J. R. Hughes Young Investigator Awardee. The AMD-Haythornthwaite Research Initiation Grant (HRIG) Program had another successful year, with 23 proposals submitted for review by the AMD. In view of the large number of high-quality proposals, Professor **Jennifer Haythornthwaite** of The Johns Hopkins University, representing the Haythornthwaite Foundation, supported four HRIG awards, while the AMD funded the fifth award. The five successful proposals were authored by **Huanyu Cheng** (Penn State), "Mechanically tunable dissolution for transient electronics"; **Shawn Chester** (NJIT), "Mechanics of photo-responsive shape memory polymers"; **Yuhang Hu** (UIUC), "Using dynamic indentation to probe the poroelastic properties of gels in micron scales"; **Haneesh Kesari** (Brown), "Bio-inspired interfacial engineering for the development of novel structural materials"; and **Shuodao Wang** (Oklahoma State), "Elucidating the correlation between inhomogeneity and interfacial fracturing in hard-soft integrated bio-compatible systems". The Haythornthwaite Travel Grant Award Program, sponsored by the Haythornthwaite Foundation, once again funded ten proposals from graduate students. The best three of those ten, as judged by the EC, were given Best Student Paper Awards by the AMD. This year's recipients were **Victor Lefevre** (UIUC), **Qihan Liu** (Harvard), and **Xiaoxuan Zhang** (Stanford).

McMAT 2015

The 2015 Applied Mechanics and Materials Conference (McMAT 2015), with the Materials Division taking the lead, took place from June 29 to July 1, 2015 in Seattle, WA. **Junlan Wang** served as the conference chair. A total of 436 contributions were presented in 25 symposia and 79 sessions. Members of the AMD were encouraged to participate, which will cycle back to the AMD in 2019.

IMECE 2016

Preparations are well under way for IMECE 2016, to be held in Phoenix, AZ, November 11-17. Bala Balachandran and Yonggang Huang will serve as chair and co-chair, respectively, of Track 12,

Mechanics of Solids, Structures and Fluids. The following AMD members will be recognized at the AMD Honors and Awards Banquet and Ceremony tentatively on Tuesday, November 15:

Ray W. Ogden (University of Glasgow)

Kyung-Suk Kim (Brown University)

Pedro Ponte Castañeda (University of Pennsylvania)

Andrea Prosperetti (Johns Hopkins University)

Pedro M. Reis (MIT)

Timoshenko Medal

Drucker Medal

Koiter Medal

Ted Belytschko Applied Mechanics Award

Thomas J. R. Hughes Young Investigator Award

The **Thomas K. Caughey Dynamics Award** was not awarded for 2016. Please join the members of the AMD EC in congratulating all awardees.

ICTAM 2016

Planning for the 24th International Congress on Theoretical and Applied Mechanics, August 21-26, 2016 in Montreal, Canada is in its final stage. Members of AMD are encouraged to participate.

Journal of Applied Mechanics

Yonggang Huang, Editor of JAM, continues his efforts to increase the quality and speed up the publication process. The full review process duration was brought down significantly to about 1.2 months on average, and the number of submissions had increased continuously to about 1000 per year. A total of 174 papers were published in 2014, and 141 in 2015. The newly-introduced “*perspective papers*” have been a particular success with thousands of downloads. The journal attracted many top researchers in the field in 2015. An annual *Best Paper Award* for young authors was established in 2013, sponsored by the AMD. The 2015 recipient, announced at IMECE 2015, was **Xuanhe Zhao** (MIT).

Applied Mechanics Reviews

Harry Dankowicz, Editor of AMR, has made significant progress in revamping the journal since 2012. In 2015, AMR published six issues totaling 323 pages. A huge success has also been the *AMR Podcast* series, launched in 2015 by Applied Mechanics Reviews and the *ASME Digital Collection*; it features full-length, edited audio interviews with members of the applied mechanics and engineering science research community. A biannual *Paper Award* was established in 2014 for AMR authors in memory of Lloyd Donnell, the first editor of AMR. The recipients of this year’s award, will be announced at IMECE 2016.

Haythornthwaite Foundation Awards

The Haythornthwaite Foundation has pledged continuous support in 2016 of the *Haythornthwaite Research Initiation Grant* (HRIG) program for young faculty and the *Student Travel Grant* program for students. In 2015, the EC received 23 proposals for HRIG and awarded five, four funded by the Foundation and one by AMD. The awardees, Huanyu Cheng, Shawn Chester, Yuhang Hu, Haneesh Kesari, and Shuodao Wang will report their work at IMECE 2016. The EC also awarded 10 Student Travel Grants. Out of the 10 Travel Grants, the Best Paper Award went to Victor Lefevre, Qihan Liu, and Xiaoxuan Zhang. With continuous support from the Foundation, the EC is planning to again award 5 initiation grants and 10 student travel awards in 2016. Both award programs will be announced via direct e-mail to AMD members as well as on the ASME web site and on imechanica. Awardees will be honored at IMECE 2016.

Technical Committees

The Technical Committees operating under the auspices of the AMD will continue to be encouraged to remain active. The primary functions of the committees include proposing and organizing

symposia at IMECE and other meetings, providing nominations for the Society- and Division-level awards as well as the Haythornthwaite award programs, and maintaining a significant web presence.

Closing Remarks

Let me close by thanking everyone who contributed to the continued success of AMD during the past year. I am grateful to all of the current members of the AMD EC for their help and support which made my term a lot easier. I appreciate the outstanding dedication of the editors and associate editors of JAM and AMR for rising the marks of the AMD journals such that they became top journals in our field. My further thanks go to the organizers of the many symposia at IMECE and other AMD-related conferences for their excellent service. Last not least the ASME staff **Ty Booker, Stacey Cooper, Deidra Hackley, Elio Manes, Jacinta McComie-Cates, and Christine Reilley** were instrumental to overcome the obstacles of the new organization of ASME. I like to thank all of them for their continuous assistance. Last not least I have to mention the support of AMD by all of our members which is provided through attendance at conferences, publishing and reviewing technical papers, and participating on Technical Committees.

Peter Wriggers,

2015-2016 Chair, Applied Mechanics Division

THE 2015 AMD AND ASME SOCIETY AWARDS

TIMOSHENKO MEDAL



The Timoshenko Medal was established in 1957 and is conferred annually 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.

Michael Ortiz



The 2015 Timoshenko Medal was awarded to Michael Ortiz, Frank and Ora Lee Marble Professor of Aeronautics and Mechanical Engineering at the California Institute of Technology for *“the seminal, groundbreaking and remarkably creative contributions that are the creation of the quasi-continuum method, the formulation of an incremental variational principle predicting dislocation sub-structures, modeling fragmentation with cohesive models, and the formulation of integrators for elastoplastic materials and variational time-integrators.”* The acceptance speech that follows below was delivered at the AMD Honors and Awards Banquet at the 2015 ASME International Mechanical Engineering Congress and Exposition held in Houston, Texas on Tuesday, November 17th, 2015:

Howdy! I am your after-dinner entertainment!

I am also this year’s Timoshenko Medal recipient, a staggering honor that I’m still trying to wrap my mind around and come to grips with. The recognition of one’s peers is the sweetest thing of all in our

line of business, and it is one of the main things that keep us going in our careers. To say that I am deeply moved and honored by this award is an understatement, I am actually tickled pink. My deepest gratitude goes to all those who took the time to nominate me and the superb fiction writers who wrote the letters of support. I would also like to thank the Timoshenko Medal Committee for seeing fit to honor me with this award. Foremost in my mind, at this time, are all my teachers, mentors, students, colleagues and collaborators over the years that made this award possible. Last but not least, I am grateful to my family and friends, above all to my parents, brother and sister, my late wife of 33 years, Minerva, and my sons Daniel and Pablo, for their life-sustaining love and support.

I actually have a personal, if twice-removed, connection with Stepan Prokopovych (Stephen) Timoshenko in that I am one of his academic grandsons, being the Ph.D. student of Egor P. Popov at UC Berkeley who was himself a Ph.D. student of Timoshenko at Stanford University. Let us take a moment to remember Stephen P. Timoshenko, eminent structural engineer, teacher and mentor, author of seminal works in the areas of engineering mechanics, elasticity and strength of materials, many of which are still widely used today. On a more personal note, I would like to recognize Timoshenko's works, grato animo, for impressing upon me, early on, the beauty of engineering, mechanics and mathematics.

Having attained a certain seniority and having been recognized as Timoshenko medalist, I am expected to reflect sagely on my life and times for your general edification. I will try to make this as painless as possible... I hope you find my remarks almost interesting...

As my accent inevitably betrays, I am a native of Spain, where I completed my schooling and my undergraduate education, the latter in la Escuela de Caminos, Canales y Puertos, literally the 'School of Roads, Canals and Harbors', the quaint traditional name of the School of Civil Engineering of the Polytechnic University of Madrid, founded in 1802 by the brilliant engineer Agustin de Betancourt y Molina under King Carlos IV. The school was modeled after the French system and, specifically, after L'École Nationale des Ponts et Chaussées, the 'National School of Bridges and Roads' in Paris, which Betancourt had visited in 1784.

Given these origins, I find it interesting to contrast this Continental European conception of undergraduate engineering education with our own undergraduate system here in the US. Our system was shaped by powerful technological, societal, corporate, national defense and federal funding pressures. Early on, the model of educating an 'engineering labor force' for industry took precedence over the Continental European notion of an 'elite engineering corps' that I was educated under. Our system of undergraduate engineering education here in the US has traditionally served the engineering profession well. However, it is not clear that the system is in keeping with the times anymore, especially as regards the ability of our engineering graduates to deal with increasingly complex technological challenges. Buoyed by these and similar concerns, the notion of requiring a master's degree for professional engineers has been hotly debated for many years. Recently, the debate has been gaining again a higher profile, exemplified by the 'Raise the Bar' initiative of the American Society of Civil Engineers (ASCE). Also, in its 2005 report entitled "Educating the Engineer of 2020", the National Academy of Engineering came out in favor of a master's degree as a requirement for licensing in engineering, as have numerous other leaders of academia and industry. Certainly, the adoption of that standard would bring engineering licensing closer to that of other distinguished professions, including law and medicine. On the other side of the debate, the idea has also drawn entrenched opposition from professional societies and industry.

It is not for me, here, to take sides in this debate or to pretend to have the answer, I really don't. I'm only reminded of one of the many pearls of wisdom that Ben Freund lavished upon me, free of charge, during my formative years at Brown University, when he said: "Michael, the reputation of an individual or institution is its greatest asset: It is as good as money in the bank". How very true!

Regardless of our views on the matter, I think that we can all agree that it is incumbent upon us, meaning academia, professional societies, national academies, licensing boards, accreditation boards and industry, to work together to preserve and augment the prestige and standing of the engineering profession in the US! As Ben Freund taught me, it is our greatest asset!

The end of my own college studies coincided with the 70's worldwide economic crisis, which in Spain was never-ending. That meant few good jobs to be had and, given the bleak situation, it occurred to me that it might be fun spending one year abroad pursuing a master's degree. I applied to the Fulbright Foundation in Madrid and I was lucky enough to get a one-year scholarship to study abroad in the US. The Foundation applied on my behalf to universities in the US broadly. I was admitted to four of them: UC Berkeley and three lesser universities, which will remain nameless. At that time I did not know Berkeley from a hole in the ground. The Fulbright Foundation advisor in Madrid told me: 'Go to Berkeley, young man'. So, I went to Berkeley. For that, I will be eternally grateful to the Foundation.

In this connection, I would like to refer to another exceptional aspect of our academic system that, I believe, is well-worth preserving. When I arrived in Berkeley in 1977, I was the typical foreign student struggling with my English and learning the ropes of a new academic system. As it turns out, I was in very good company indeed! A 2013 report of the National Foundation for American Policy, which analyzes National Science Foundation enrollment data from 2010 by field and institution, provides some amazing figures: foreign students made up the majority of enrollments in US graduate programs in science, technology, engineering and mathematics, or (STEM) programs, ranging from 70.3% of all full-time graduate students in electrical engineering to 40.3% in Chemistry.

Our system of graduate studies has traditionally been open to—and welcoming of—international students. In fact, our ability to attract top talent world-wide to our graduate programs is the envy of the world. However, there are no grounds for complacency. The US visa options for graduating Ph.D. students remain arcane and onerous. The list of sensitive countries whose students are subject to special restrictions remains long. Export control regulations keep expanding and increasingly restrict participation of foreign students. Most troubling of all, some federal funding agencies are now placing restrictions on foreign-student participation. These concerns were lucidly articulated in a 2004 report of the Council on Governmental Relations (COGR) and the American Association of Universities (AAU), to the White House Office of Science and Technology Policy (OSTP), entitled "Restrictions on Research Awards: Troublesome Clauses." These are troubling trends indeed, in my opinion. I submit to you that it behooves the academic community to be vigilant and work together to ensure that US universities remain true to their universal calling and mission and remain open to all worthy students, regardless of origin!

Going back to my own lifeline, Berkeley for me was an extreme formative experience. I fell immediately enamored with the intellectual ferment, the scholarly research that took place there, the can-do attitude, the feeling of being part of a cutting-edge avant-garde. Egor Popov was the perfect advisor. His humanity, his high standards of scholarship and his stature as a practicing engineer were greatly inspirational to me. I was fortunate to learn continuum mechanics from Karl Pister, continuum thermodynamics from Jacob Lubliner, computational mechanics from Bob Taylor, all part of the now mythical Structural Engineering and Structural Mechanics division. I was also given free rein to take courses in other departments, which I did with abandon, including courses in mechanical engineering, electrical engineering, physics and mathematics. Popov generously gave me free rein to work with other faculty members and graduate students, which I also did with relish. I was fortunate to work with Jacob Lubliner on materials with memory and with Karl Pister and Bob Taylor on computational mechanics. I also had the opportunity to interact with brilliant graduate students such as Peter Pinsky and the late Juan Carlos Simó. I look back to those times with great nostalgia and fondness...

My graduate studies at Berkeley came to a very reluctant end in 1982. The one down side of Fulbright Scholarships is that they require the recipients to go back to their countries of origin for a period of two years. So, I dutifully lined up post-docs back in Spain working in government labs. By my own reckoning, I spent back in Spain two years and three days. That gives you an idea of how I feel about forcing our graduate students to return to their countries of origin against their wills...

In the second year as a post-doc in Madrid, I managed to line up three faculty job interviews back in the US during the Christmas break of 1983. One of them was at Brown, where my good friend from Berkeley, Peter Pinsky, had just vacated a position in solid mechanics by moving to Stanford, something for which I will remain eternally grateful to Peter. Three months later, in March of 1984, I received a phone call from Rod Clifton while I was hard at work at the Ministry of Public Works in Madrid. He said that the search committee at Brown had decided to make me an offer. I immediately answered: "I accept!" That must have been the shortest faculty job negotiation in history! There was really nothing to negotiate. I knew that that was my big break. That same June, I was in Providence with my wife Minerva. My startup package amounted to a grand total of \$5,000. It was plenty.

In fact, I believe that startup packages for junior faculty are somewhat overrated and overblown these days. In my opinion, what is really important for young faculty starting out is good colleagues, good students and good shared facilities. Brown provided those in spades. For me Brown was like a second and a third Ph.D.'s. I really received a tremendous education from my colleagues. The micromechanics revolution was in full swing at that time, which meant that there was plenty of interesting problems to work on. My senior colleagues, Jerry Weiner, Ben Freund, Rod Clifton, Alan Needleman and Bob Asaro, took me under their wing and introduced me to the mechanics community, the funding agencies, included me in group proposals such as MRLs and URIs. I could not have hoped for better mentoring. My junior colleagues at the time included Rick James and Subra Suresh. Talk about a star lineup! Three years after I arrived in Brown, Alan Needleman came to my office and announced: "It is time for you to get tenure". I said: "OK". Three months later, Alan Needleman came back to my office and said: "You have tenure". And I said: "OK". And that was that. Those were simpler times indeed...

These reminiscences bring me to another pet subject that I enjoy musing about, given the opportunity: Our tenure-track system for junior faculty and our system of tenure. Tenure is the cornerstone of our academic freedom, an essential requirement for creativity and innovation. The institution of academic tenure was put in place in the US as early as the late 19th century, and was significantly reinforced after the Second World War, to assure that faculty could not be fired for their views. Indeed, we are in the business of generating new ideas that, sometimes, challenge entrenched and established interests or conceptions. These challenges would not be possible without the academic freedom that comes with tenure.

Regrettably, tenure and, by extension, academic freedom, has been increasingly under siege in the US in recent years, especially at public universities. The recent cases of Wayne State University in Detroit, Michigan, the University of Wisconsin, and others, come immediately to mind in that regard. Fortunately, top universities understand that, without tenure, they would not be able to attract top talent to the faculty, which itself is a requirement for being able to secure highly-competitive federal funding, a major part of the operating budget of most universities. This bodes well for the future. However, here again there are no grounds for complacency. Already, only one in four university instructors nationwide are tenured or tenure-track. Tenure review procedures, junior-faculty tracking committees, and other similar bureaucratic-minded procedures that undermine tenure and the independence of junior faculty are becoming increasingly common. Here again, I believe that we need to work together as a community to safeguard academic freedom and the tenure and tenure-track institutions on which it is founded!

Going back to my own lifeline, in 1994 I went on sabbatical to Caltech as a Fairchild scholar. My late wife, Minerva, was part of an extended family of eight brothers and sisters, countless cousins, nieces and nephews, all of whom lived in California. Our two sons, Daniel and Pablo, were eight and four at the time, and we thought that growing up as part of an extended family would be greatly to our sons' benefit. So, in 1995 I officially joined Caltech, where I have now enjoyed over twenty glorious and blissful years with wonderful colleagues and students. Nevertheless, the move from Brown was bittersweet and Minerva, the boys and I have always kept the fondest memories of our time back in Rhode Island.

Fast-forward to 2015. How has applied mechanics changed since I was a graduate student back at Berkeley? Well, the evolution of the field, that I have had the good fortune of witnessing and being part of, has been truly momentous in a number of ways, including veritable revolutions in experimental science, computational science and applied mathematics. This ferment of innovation, adaptability and renewal, which continues unabated at present, attests to the vitality of applied mechanics and bodes well for the future of the field.

The advances in experimental science over the past three decades have been phenomenal, including digital imaging, microscopy, diffraction methods, sensing and others. These advances have provided impetus for the development of new theories of material behavior and new computational paradigms, such as multiscale modeling and simulation. They also have changed radically the nature of applied mechanics from a data-starved field to an increasingly data-rich field, which opens the way for the application of emerging paradigms such as Data Science.

The growth of computational mechanics has been equally astounding. Several stubborn challenges have kept the field going strong to this day. One of those challenges is material modeling and, by extension, multiscale modeling and simulation, the going material modeling paradigm of choice at present. From the early days, discerning computational mechanics understood that the fidelity of our material models is one of the main bottlenecks that limit the predictiveness of our codes. Indeed, the results of our simulations are only as good as the material models we use, never better. Other bottlenecks, such as resolution and clock time, could be addressed through advances in raw computing power and the use of brute force. By contrast, the search for better material theories and models has been a truly intellectual endeavor. It naturally led to the consideration of the physics underlying material behavior at increasingly smaller length and time scales. This is what we now call 'multiscale analysis', a trend that effectively continued the micromechanics revolution of earlier days.

At some point in this quest, solid mechanics finally descended to the atomic and quantum shires and, there, they came face to face with an interesting and quaint folk: applied physicists and physical chemists. For me, this handshake had two particular names: Rob Phillips and Emily Carter. I will be forever indebted to them for all that they taught me and for the unrelenting intellectual stimulation that they provided.

The growth of scientific computing over the past three decades has been remarkable indeed. However, here I would like to take a somewhat contrary view: In my opinion, scientific computing has become so prevalent and dominant that we may rightly begin to wonder whether it is having a stifling effect on science altogether. To paraphrase an old tobacco ad: "Are we computing more and more, but enjoying it less and less?" The fundamental problem is that computers have great trouble dealing with complexity, or "NP-complete" problems, as they are sometimes referred to. Give a computer an NP-complete problem to analyze and it dies, regardless of computational power. By contrast, the human brain has evolved an extraordinary capacity for abstraction, for dealing with complexity and to generate true conceptual knowledge. The pressing philosophical question is: "Does scientific computing generate true knowledge or just the appearance of knowledge?" This and similar deep questions are being increasingly raised and debated in connection with the emerging field of Data

Science. In a review article on the subject, Katarina Avramides, of the University College of London, cautions us: "Technology makes it easier to generate information that does not constitute knowledge but is perceived as such." She goes on to add: "Recipients of this information lack understanding of knowledge validation." In my opinion, the problem arises when scientific computing becomes the 'be all and end all' of science, at the expense of theory and experiment. The act of sitting down at the keyboard to code should be the last step of a long thought process, not the first step. At best, we should regard scientific computing as an interim tool to be used, for lack of anything better, while we generate true scientific knowledge, either experimentally or by force of reason.

In this latter regard, I would like to mention, in closing, another breathtaking revolution that has quietly taken place over the last three decades in the field of mathematics and that impinges directly and powerfully on theoretical mechanics: the development of the 'modern calculus of variations'. This endeavor was pioneered by Charles B. Morrey, Jr., at UC Berkeley and Ennio de Giorgi, at the University of Pisa, two of the greatest mathematicians of the 20th century. It was developed further by the remarkable generation of mathematicians that followed, including the likes of Luigi Ambrosio, John M. Ball, Robert V. Kohn, and Gianni dal Maso, among others, and later by their students. The modern calculus of variations is an intellectual tour de force that does generate true knowledge by force of reason. The notions of weak convergence that pervade the field are every bit as fundamental as statistical mechanics or continuum thermodynamics. They provide just the 'hammer' that is needed for dealing effectively with complexity in physical systems, precisely the type of complexity that computers have great trouble with. I believe that developments in mathematics and theoretical mechanics will have a strong role to play in the future as a complement and counterweight to scientific computing. For me, personally, the opportunity to work with mathematicians of the caliber of Stefan Mueller, Alexander Mielke, Andrea Braides, Adriana Garroni and Sergio Conti has been one of the most rewarding, enlightening, but also humbling, experiences of my career.

But, to paraphrase Jane Austen, I believe that "I have delighted you long enough". I will, therefore, hastily take my leave expressing my firm believe that the state of applied mechanics is strong, its future is bright, and thanking you kindly for your patience and indulgence. Thank you very much!

Michael Ortiz

*Frank and Ora Lee Marble Professor of Aeronautics and Mechanical Engineering
California Institute of Technology*

DANIEL C. DRUCKER MEDAL

**Krishnaswamy
Ravi-Chandar**



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. Instituted by the Applied Mechanics Division, the medal honors Dr. Daniel Drucker and commemorates his service to the profession.



The 2015 Daniel C. Drucker Medal was awarded to Professor Krishnaswamy Ravi-Chandar, Professor of Aerospace Engineering and Engineering Mechanics at The University of Texas at Austin, for “*seminal contributions to the understanding of dynamic fracture and failure of solids.*”

WARNER T. KOITER MEDAL

**Kaushik
Bhattacharya**



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.



The award was funded by the Technical University of Delft, The Netherlands, to honor Warner T. Koiter for his fundamental work in nonlinear stability of structures in the most general sense, for his diligence in the effective application of these theories, his international leadership in mechanics, and his effectiveness as a teacher and researcher.

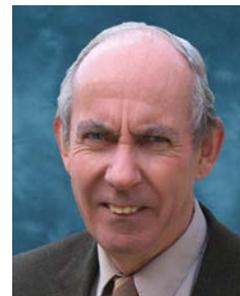
The 2015 Warner T. Koiter Medal was given to Kaushik Bhattacharya, Howell N. Tyson, Sr. Professor of Mechanical and Civil Engineering at the California Institute of Technology, for “*the development of novel, rigorous, and predictive methods for the multiscale behavior of modern engineering materials at scales ranging from the sub-atomic to the polycrystal, with special focus on multi-functional materials.*”

TED BELYTSCHKO APPLIED MECHANICS AWARD

J. R. Barber

The Ted Belytschko Applied Mechanics Award is bestowed to an outstanding individual for significant contributions in the practice of engineering mechanics. The contributions of this individual may result from innovation, research, design, leadership or education. The award was established in 1988 and was renamed the Ted Belytschko Applied Mechanics Award in 2008.

The 2015 Ted Belytschko Applied Mechanics Award was conferred upon J.R. Barber, Jon R. and Beverly S. Holt Professor of Engineering and Arthur F. Thurnau Professor of Mechanical Engineering and Applied Mechanics at the University of Michigan, for “*numerous and substantial contributions to contact mechanics and elasticity, characterized by exemplary clarity and precision, ranging from rigorous proofs of general theorems in mechanics to the development of methods for direct use in industry.*”



THOMAS K. CAUGHEY DYNAMICS AWARD**Gábor Stépán**

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.



The 2015 Thomas K. Caughey Dynamics Award was conferred upon Gábor Stépán, Professor of Applied Mechanics at the Budapest University of Technology and Economics, for *“sustained, original, and groundbreaking contributions to the field of nonlinear dynamics and vibrations with particular application to mechanical systems governed by delay-differential equations and for his dedication to research mentorship, dynamics education, and professional leadership.”*

THOMAS J.R. HUGHES YOUNG INVESTIGATOR AWARD**Thao (Vicky) Nguyen**

The Thomas J.R. Hughes Young Investigator Award recognizes special achievement for young investigators in Applied Mechanics. The nominees must not have reached their 40th birthday at the time of nomination. The award was established in 1998 and renamed the Thomas J.R. Hughes Young Investigator Award in 2008.



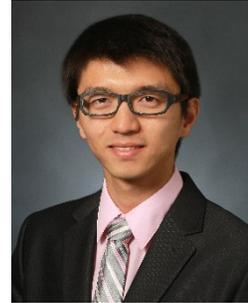
The 2015 Thomas J.R. Hughes Young Investigator Award was given to Thao (Vicky) Nguyen, Associate Professor of Mechanical Engineering at Johns Hopkins University, for *“outstanding contributions to polymer mechanics and biomechanics. She has developed fundamental and innovative physics-based models for the mechanics of shape memory polymers, and conducted outstanding work on the complex mechanics of the eye. She has shown a remarkable ability to identify the key mechanics issues in complex soft material problems, and then to develop novel theoretical and experimental tools to address these issues.”*

2015 HAYTHORNTHWAITE FOUNDATION AWARDS**Haythornthwaite Research Initiation Grants**

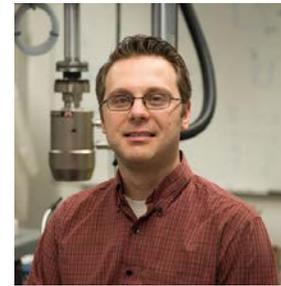
In 2011 the Applied Mechanics Division, through the generosity the Haythornthwaite Foundation, established a new divisional award, the **Haythornthwaite Research Initiation Grant**. This new grant targets university faculty that are at the beginning of their academic careers engaged in research in theoretical and applied mechanics. The five recipients of the 2015 grants are **Huanyu Cheng** (Pennsylvania State University), **Shawn A. Chester** (New Jersey Institute of Technology), **Yuhang Hu** (University of Illinois at Urbana-Champaign), **Haneesh Kesari** (Brown University), and **Shuodao Wang** (Oklahoma State University). The winning project titles and descriptions are provided in what follows.

Haythornthwaite Research Initiation Grant**Huanyu Cheng**

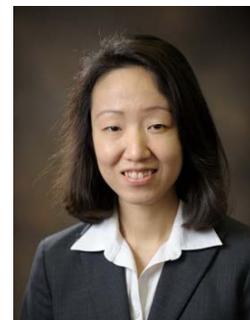
Mechanically tunable dissolution for transient electronics. The transient devices target at diagnostic/therapeutic platforms where they function stably for a bio-relevant timeframe, followed by a rapid degradation to eliminate the need for recollection. The encapsulation layer plays a critically important role in programming the lifetime of the device. The objective of this proposed research is to study the fundamental mechanics strategies for tunable dissolution of the encapsulation layer, and to develop novel design structures to control the dissolution behavior of transient electronic devices for biomedical applications. Specifically, the encapsulation layer with engineered porous structures would deform upon mechanical stimuli to dramatically change its coupled diffusion/dissolution behavior. This grant is being used to set up dissolution testing apparatuses that will be used to motivate and validate the design.

**Haythornthwaite Research Initiation Grant****Shawn A. Chester**

Mechanics of photo-responsive shape memory polymers. The objective of this work is to design and build a capability for the manufacture and photo-mechanical characterization of photo-responsive shape memory polymers. Shape memory polymers are a well-known class of active materials that respond to various stimuli in their environment. While thermally responsive polymers have been known and well studied for decades, photo-responsive shape memory polymers are an emergent class of materials only now coming into the forefront of mechanics. The grant is being used to construct the experimental infrastructure to measure the photo-mechanical behavior of shape memory polymers under combined loading. Such laboratory facilities are critical to provide the mechanics community with experimental data for the calibration and validation of constitutive models.

**Haythornthwaite Research Initiation Grant****Yuhang Hu**

Using dynamic indentation to probe the poroelastic properties of gels in micron scales. Gels are composed of crosslinked polymeric network and solvent molecules. Although gels have been explored in various applications, the designs based on these materials in this stage remain mostly trial-and-error, owing to a lack of fundamental understanding of the complex time-dependent behavior of gels. Despite its importance, the experimental data that promote these fundamental studies are rare in literature. The objective of this research is to develop a robust dynamic indentation technique capable of characterizing the time-dependent properties of gels in micron and smaller length scales. The grant is being used to set up a custom-built vibration stage that can be integrated into commercial Atomic Force Microscope for material testing.



Haythornthwaite Research Initiation Grant**Haneesh Kesari**

Bio-inspired interfacial engineering for the development of novel structural materials. Structural biomaterials (SBs), such as bones and shells, possess some remarkable mechanical properties, such as high toughness, strength, and damage tolerance. SBs are often composites, comprising a stiff mineral phase and a compliant protein. The mineral phases are brittle and the mineral-protein interfaces are weak. The SBs' remarkable properties are thought to be due to some new mechanisms that are precipitated by their elaborately organized weak interfaces. A key impediment to the discovery of the SBs' new mechanisms is a clear understanding of the weak interfaces' mechanical behavior. We propose to construct a mechanical testing stage and use it to derive the deformation and fracture constitutive behavior of the weak interfaces in a model SB. The experimental efforts will be synergistically combined with theory and computations to discover the new mechanisms that underlie the SB's remarkable properties.

**Haythornthwaite Research Initiation Grant****Shuodao Wang**

Elucidating the Correlation between Inhomogeneity and Interfacial Fracturing in Hard-Soft Integrated Bio-Compatible Systems. The objective of this proposed work is to develop advanced mechanisms and fabrication processes to prevent interfacial fracture in hard-soft integrated heterogeneous systems. Comprehensive theoretical, numerical and experimental studies will enable the design and fabrication of heterogeneous systems that can be deformed like soft tissues without fracturing. The resulting systems are expected to bring opportunities for important future applications in healthcare, bio-mimicking systems, as well as ultra-thin, wearable human-machine interfaces. The grant is being used to build a customized advanced stretching stage that is capable of measuring the critical energy release rate at the onset of interfacial fracturing. The measurements will validate the micro-mechanics theories and the numerical findings.

**Student Travel Grants and Best Paper Awards**

The Haythornthwaite Travel Grant Award Program for graduate students, sponsored by the Haythornthwaite Foundation, awarded ten travel grants in 2015. The best three of those ten, as judged by the Executive Committee, were given the Best Student Paper Award by the AMD. The 2015 recipients of this award were **Victor Lefevre** (University of Illinois at Urbana-Champaign), **Qihan Liu** (Harvard University), and **Xiaoxuan Zhang** (Stanford University). Like the Haythornthwaite Research Initiation Grants, the Best Paper Awards were conferred upon the three winners at the AMD Honors and Awards Banquet on Tuesday, November 17, 2015 in Houston, Texas.

AMD Honors and Awards Banquet, IMECE 2015



AMD Chair Peter Wriggers presents the Timoshenko Medal to Michael Ortiz (*left*) and the Daniel C. Drucker Medal to Krishnaswamy Ravi-Chandar (*right*) at the AMD Honors and Awards Banquet.



Peter Wriggers presents the Warner T. Koiter Medal to Kaushik Bhattacharya (*left*) and the Ted Belytschko Applied Mechanics Award to J. R. Barber (*right*).



Peter Wriggers presents the Thomas K. Caughey Dynamics Award to Gábor Stépán (*left*). Michael Ortiz during his Timoshenko Medal acceptance speech (*right*).

NEWS FROM THE TECHNICAL COMMITTEES

The reports that follow are from some of the Technical Committees (TCs) of the Division of Applied Mechanics. If you are interested in the activities of a particular committee, please feel free to contact the leadership of the committees.

Computing in Applied Mechanics Technical Committee

Chair: [Vikas Tomar](#), Purdue University (2014-2016)

Vice-Chair: [Harold Park](#), Boston University (2014-2016)

In 2015, the AMD Computing in Applied Mechanics Committee meeting was held on Monday, November 16 at the Hilton Americas Hotel at the 2015 IMECE in Houston. Caglar Oskay was chosen as the new Vice-Chair, for the 2016-2018 time period. The following minisymposia were proposed for IMECE 2016:

1. *Modeling of Material Failure Using Approaches Beyond Locality: A Celebration of Dr. Stewart Silling's 60th birthday*, organized by Florin Bobaru, John Foster, Erdogan Madenci and Ibrahim Guven
2. *Multiphysics Simulations and Experiments for Solids*, organized by Dong Qian, Justine Johannes, Hanqing Jiang and Harold Park
3. *Multi-scale Computations in Fluids, Structures and Materials*, organized by Yozo Mikata and Glaucio Paulino
4. *Damage Biomechanics*, organized by Siddiq Qidwai, Amit Bagchi, Karim Muci-Kuchler and Reuben Kraft
5. *Computational Engineering and Simulation*, organized by Mustapha Fofana, Justine Johannes and Vikas Tomar

Instabilities in Solids and Structures Technical Committee

Chair: [Ryan Elliott](#), University of Minnesota

Vice-Chair: Edmundo Corona, Sandia National Laboratory

The Instabilities in Solids and Structures (IiSS) Technical Committee has been very active during the 2015-2016 year. The committee is Chaired by Ryan S. Elliott of the University of Minnesota and Vice-Chaired by Edmundo Corona of Sandia National Laboratory. During the past year, the committee has organized sessions at McMat-2015 in Seattle and the ASME-IMECE-15 in Houston. At McMat-2015 the committee organized a minisymposium with five sessions and 26 presentations:

- (9) *Instability in Solids and Structures:*
- | | |
|---------------|-----------------|
| Monday (9-1): | 5 presentations |
| Monday (9-2): | 5 presentations |
| Monday (9-3) | 5 presentations |
| Tuesday (9-4) | 5 presentations |
| Tuesday (9-5) | 6 presentations |

At ASME-IMECE-15 the committee organized a minisymposium with five sessions and 24 presentations:

(12-1) *Instability in Solids and Structures*

12-1-1 Instability in Solids and Structures I:	5 presentations
12-1-2 Instability in Solids and Structures II:	5 presentations
12-1-3 Instability in Solids and Structures III:	5 presentations
12-1-4 Instability in Solids and Structures IV:	5 presentations
12-1-5 Instability in Solids and Structures V:	5 presentations

These sessions were well attended and contributed to the overall success of these events. The committee is currently organizing a minisymposium for ASME-IMEME-16 in Phoenix, with help from Dai Okumura of Osaka University, Suita, Japan, and expects to have 35 presentations.

The symposia organized by the committee have been very successful and regularly attract high-quality presentations and are some of the biggest symposia at these events.

We welcome members of the applied mechanics community to participate by soliciting and actively recruiting high-quality contributions to the symposia sponsored by the Instabilities in Solids and Structures Technical Committee.

Composite Materials Technical Committee

Chair: [Valeria La Saponara](#), University of California, Davis, USA (2015-2017)

Vice Chair: [Caglar Oskay](#), Vanderbilt University, USA (2015-2017)

Last year's AMD Composite Materials Committee meeting was held on Tuesday, November 17, 2015 at the Hilton Americas, Room 339A, Houston, TX, USA. 20 committee members were in attendance at the meeting.

At IMECE 2015, the committee members organized 10 multidisciplinary topics: namely, 1-10 ("*Multiscale Computational Modeling of Composite Materials and Structures*", co-sponsored by the Aerospace Division), and many topics co-sponsored by the Materials Division, such as 11-5 ("*Nanostructured Materials for Energy Applications*"), 11-7 ("*A Short Course on Integrated Computational Materials Engineering (ICME): A Transformative Discipline*"), 11-16 ("*Multifunctional Materials and Hybrid Materials: Modeling, Design and Processing*"), 12-2 ("*Mechanics and Design of Cellular Materials*"), 12-24 ("*Time-Dependent Materials and their Composites*"), 12-34 ("*Multi-Field Studies in Heterogeneous Materials: Experimental, Theoretical and Numerical Approaches*"), 12-35 ("*Nanocomposite Fibers*"), 12-39 ("*Advanced Multiscale Materials: Natural Fiber- and Metal-Based Biomaterial Composites*"), 12-43 ("*Processing and Performance of Nanocomposites*").

Several topics were discussed at the meeting: the lack of paper copies of the conference program, feedback on the ASME app, the cost of student and post-doc registration, the time allotted for each talk and for the invited speakers' talks, concurrent presentations by the same author at the same time.

Symposia were proposed for IMECE 2016, and the following list was put forward at a later date in November:

In Track 1

1. “*Multiscale Models and Experimental Techniques for Composite Materials and Structures*”. Organizers: Evan Pineda (evan.j.pineda@nasa.gov, NASA Glenn), Caglar Oskay (caglar.oskay@vanderbilt.edu, Vanderbilt University) and Dianyun Zhang (dianyun@engr.uconn.edu, University of Connecticut), co-sponsored by the Aerospace Division Structures and Materials TC, and the Materials Division Composites and Heterogeneous Materials TC.

In Track 3

2. “*Biological Tissues and Materials: Modeling, Synthesis and Characterization*”. Organizers: Guy Genin (genin@wustl.edu, WashU St. Louis), Hai-Chao Han (haichao.han@utsa.edu, UT San Antonio), Karen Yan (yan@tcnj.edu, The College of New Jersey), co-sponsored by the Bioengineering Division and the Materials Division Composites and Heterogeneous Materials TC.

In Track 11

3. “*A Short Course on Integrated Computational Materials Engineering (ICME): A Transformational Discipline*”. Organizers: Natasha Vermaak (vermaak@lehigh.edu, Lehigh University), Evan Pineda (evan.j.pineda@nasa.gov, NASA Glenn), co-sponsored by the Aerospace Division Structures and Materials TC, and the Materials Division Composites and Heterogeneous Materials TC.

In Track 12

4. “*Synthesis and Performance of Nanocomposites*”. Organizers: Davood Askari (Davood.Askari@wichita.edu, Wichita State University) and Mohammad Naraghi (naraghi@tamu.edu, Texas A&M University).
5. “*Modeling and Experiments in Nanomechanics and Nanomaterials*”. Organizers: Yozo Mikata (aquarius_ym@hotmail.com, Bechtel) and Jeffrey W. Kysar (jk2079@columbia.edu, Columbia University).
6. “*Advanced Multiscale Materials, Natural Fiber- and Metal-based Biomaterial Composites*”, Organizers: Emmanuel Ayorinde (emmanuel.ayorinde@wayne.edu, Wayne State University), Joon Sang Lee (Yonsei University) and Gururaj Kathawate (Athena Engineers).
7. “*Time Dependent Materials and their Composites: Experimental, Theoretical and Numerical Studies*”, Organizers: Anastasia Muliana (amuliana@tamu.edu, Texas A&M University), Daniel Tscharnuter (Daniel.Tscharnuter@pccl.at, Polymer Competence Center Leoben) and Ioannis Chasiotis (chasioti@illinois.edu, University of Illinois at Urbana-Champaign), co-sponsored by the Materials Division Composites and Heterogeneous Materials TC.
8. “*Multi-field Studies in Heterogeneous Materials: Experimental, Theoretical and Numerical Approaches*”. Organizers: Anastasia Muliana (amuliana@tamu.edu, Texas A&M University), Valeria La Saponara (vlasaponara@ucdavis.edu, University of California, Davis), Rani Elhajar (elhajar@uwm.edu, U Wisconsin-Milwaukee), Wahyu Lestari (lestariw@erau.edu, Embry-Riddle Aeronautical University-Prescott) and Arun Srinivasa (asrinivasa@tamu.edu, Texas A&M University), co-sponsored by the Materials Division Composites and Heterogeneous Materials TC.
9. “*Interphase Phenomena*”. Organizers: Pavan Kolluru (pavan.kolluru@northwestern.edu, Northwestern University) and Oscar Lopes-Pamies (pamies@illinois.edu, UIUC).

10. “*Multifunctional and Micro/Nano-structured Materials: Modeling and Characterization*”. Organizer: Xin-Lin Gao (xliao@smu.edu, Southern Methodist University), co-sponsored by the Materials Division Composites and Heterogeneous Materials TC.
11. “*Durability and Life Prediction of Advanced Materials*”. Organizers: Mohammad Kamal Hossain (hossainm@mytu.tuskegee.edu, Tuskegee University), Mahbub Ahmed (mkahmed@saumag.edu, Southern Arkansas University), Mosfequr Rahman (mrahman@georgiasouthern.edu, Georgia Southern University).
12. “*Green and Biocompatible Nanocomposites*”. Organizers: Mohammad Kamal Hossain (hossainm@mytu.tuskegee.edu, Tuskegee University), Nazmul Islam, (nazmul.islam@utb.edu, The University of Texas at Brownsville).
13. “*Mechanics and Design of Cellular Materials*”. Organizers: Jaehyung Ju (jaehyung.ju@unt.edu, University of North Texas), Jongmin Shim (jshim@buffalo.edu, University at Buffalo), Muhammad Ali (alim1@ohio.edu, Ohio University), Byoung-Ho Choi (bhchoi@korea.ac.kr, Korea University), co-sponsored by the Materials Division Composites and Heterogeneous Materials TC.

The meeting was adjourned, and minutes were sent by the Vice-Chair.

Technical Committee on Fluid-Structure Interaction

Chair: [Kenji Takizawa](#), Waseda University

Vice Chair: [Ming-Chen Hsu](#), Iowa State University

Another good year for the Technical Committee on Fluid-Structure Interaction (CFSI). We focused on the following activities:

CFSI organized the following conferences and minisymposia at international conferences:

1. CFSI Committee members, Professors Yuri Bazilevs and David Benson, were the Co-Chairs of the *13th US National Congress on Computational Mechanics (USNCCM13)* in San Diego, a premier US Computational Mechanics bi-annual conference. The conference took place on July 26-30, 2015 and attracted 1,300 participants.
2. At the same congress, three minisymposia (*Biomedical Fluid Mechanics and FSI; Flows With Moving Boundaries and Interfaces; Fluid-Structure Interaction*) took place. The organizers were Yuri Bazilevs, Ming-Chen Hsu, Kenji Takizawa, and Tayfun Tezduyar.
3. Also at USNCCM13, Dominik Schillinger (University of Minnesota), Fehmi Cirak (University of Cambridge), Alexander Düster (Hamburg University of Technology), Isaac Harari (Tel-Aviv University), Ming-Chen Hsu, and Martin Ruess (University of Glasgow) organized a minisymposium titled “*Immersed/Embedded/Fictitious Domain Methods and Their Application in Analysis and Optimization*”.
4. Ming-Chen Hsu, Martin Ruess and Dominik Schillinger organized a minisymposium titled “*Advanced Numerical Methods in Computational Biomechanics*” at the Engineering Mechanics Institute Conference 2016 (EMI 2016) at Vanderbilt University in Nashville, Tennessee on May 22-25, 2016.
5. Fehmi Cirak, John Dolbow (Duke University), Isaac Harari, Ming-Chen Hsu, Tom Hughes (The University of Texas at Austin) and Dominik Schillinger organized a minisymposium titled “*Innovative Non-Boundary-Fitted Discretization Methods*” at the VII European Congress on Computational Methods in Applied Sciences and Engineering (ECCOMAS Congress 2016) on Crete Island, Greece on June 5-10, 2016.

6. Ming-Chen Hsu and Yue Yu (Lehigh University) organized a minisymposium titled “*High-Order and Isogeometric Methods for Multiphysics and Multiscale Problems*” at the International Conference on Spectral and High Order Methods (ICOSAHOM 2016) in Rio de Janeiro, Brazil on June 27-July 1, 2016.

The following publication activities are done or in the final stages:

1. Wiley textbook on computational FSI, co-authored by Yuri Bazilevs, Kenji Takizawa and Tayfun E. Tezduyar, has been translated to Japanese by Morikita Publishing Company.
2. Special issue in *Computers & Fluids on AFSI 2014* edited by Yuri Bazilevs and Kenji Takizawa is in the final stages. The special issue celebrates Professor Tayfun Tezduyar’s (Rice University, former Chair of ASME-AMD) 60th birthday.
3. Birkhauser edited volume “*Advances in Computational Fluid–Structure Interaction*” by Yuri Bazilevs and Kenji Takizawa is to be published by Springer. The edited volume is also dedicated to Professor Tayfun Tezduyar on the occasion of his 60th birthday.

The following activities are planned for the future:

1. Three minisymposia (*Biomedical Fluid Mechanics and FSI; Flows With Moving Boundaries and Interfaces; Fluid-Structure Interaction*) will take place at the Engineering Mechanics Institute Conference 2017 (EMI2017) in San Diego, California on June 5–7, 2017. Organizers are Yuri Bazilevs, Kenji Takizawa, and Tayfun Tezduyar.
2. Three minisymposia (*Biomedical Fluid Mechanics and FSI; Flows With Moving Boundaries and Interfaces; Fluid-Structure Interaction*) will take place at the 19th International Conference on Finite Elements in Flow Problems (FEF 2017) in Rome, Italy on April 5–7, 2017. Organizers are Yuri Bazilevs, Kenji Takizawa, and Tayfun Tezduyar.
3. At the same conference, John Evans (University of Colorado Boulder), Artem Korobenko (University of California, San Diego) and Ming-Chen Hsu will organize a minisymposium titled “*Stabilized, Multiscale, and Isogeometric Methods in CFD*”.
4. Ming-Chen Hsu, Artem Korobenko and Mike Scott (Brigham Young University) will organize a thematic session titled “*Industrial Applications of IGA and Meshfree Methods*” at the 2016 USACM Conference on Isogeometric Analysis and Meshfree Methods in La Jolla, California on October 10-12, 2016.
5. At the same conference, Laura De Lorenzis (Technische Universität Braunschweig), Ming-Chen Hsu and Harald van Brummelen (Eindhoven University of Technology) will organize a thematic session titled “*Application of IGA and Meshfree Methods to Coupled Problems and Contact*”.

Mechanics of Soft Materials Technical Committee

Chair: [Chris Yakacki](#), University of Colorado at Denver
 Vice-Chair: [Kevin Long](#), Sandia National Laboratories
 Secretary: [Shawn Chester](#), New Jersey Institute of Technology
 Editor: [Shengqiang Cai](#), University of California at San Diego

The Mechanics of Soft Materials Committee had another great year. Our sessions at conferences continue to be highly active, full of high-quality talks, and well attended. The committee is chaired by Chris Yakacki of the University of Colorado at Denver, the Vice-Chair is Kevin Long of Sandia National Lab, the Secretary is Shawn Chester of the New Jersey Institute of Technology, and the Editor is Shengqiang Cai of the University of California at San Diego. Over the past year we routinely provide information to our membership and have organized topics and sessions at the IMECE.

Specifically, at the IMECE 2015 the committee organized the following 7 symposia with 85 individual talks:

- 12-15 Soft Active Materials (24 talks)
- 12-16 Soft Materials with Chemistry: Gels and Beyond (13 talks)
- 12-17 Interphase Phenomena (5 talks)
- 12-18 Instabilities in Soft Materials and Structures (6 talks)
- 12-19 Mechanics of Biological Materials and Structures (13 talks)
- 12-20 3D Printed Soft Materials (13 talks)
- 12-21 Mechanics and Materials of Soft Electronics and Structures (11 talks)

For the upcoming IMECE 2016 the committee is in the process of organizing the following symposia and sessions:

12-51 Mechanics of Soft Materials:

- Active Materials
- Mechano-Chemistry
- Mechanics of Active Biological Materials and structures
- 3D-Printed Soft Materials
- Mechanical Characterization of Soft Materials
- Degradation and Failure in Soft Materials
- Computational Methods for Soft Materials

12-8 Instabilities in Soft Matter Solids and Structures (jointly with the *Instabilities Committee*)

12-25 Interphase Phenomena (jointly with the *Composites Committee*)

We encourage active new members to participate by contributions to the sessions, and taking leadership roles in this committee. We look forward to another promising year.

Dynamics and Control of Systems and Structures Technical Committee

Chair: [Ioannis T. Georgiou](#), National Technical University of Athens

Vice-Chair: [Jian-Qiao Sun](#), UC Merced

Secretary: [Pezhmanpe Phassanpour](#), Loyola Marymount University

The Dynamics and Control of Systems and Structures (DCSS) Technical Committee met at the IMECE 2015 meeting in Houston, Texas. The new officers are: Ioannis T. Georgiou (Chair), Jian-Qiao Sun (Vice-Chair), and Pezhmanpe Phassanpour (Secretary).

At the meeting a major revision of the bylaws was approved. One change is the enlargement of the 25-member body of the committee. The committee is accepting new members. It was discussed and emphasized that the DCSS technical committee shall continue to be the natural sponsor of Track 5-*Dynamics and Control* of the IMECE conferences and in particular of the IMECE 2016 meeting in Phoenix, Arizona. The chair discussed the possibility of the establishment of an Award at the committee level in the area of dynamics and control of structures and systems with emphasis on experimental and computational structural dynamics. The next annual meeting will be held during the IMECE 2016.

NEWS FROM THE ASME-AMD JOURNALS

Journal of Applied Mechanics

JAM continues to publish very fast, with the average time for the first round of review less than two weeks. The average time for the authors' revision and second round of review is ~25 days. This has led to a substantial increase of submissions, while the paper acceptance rate decreased to 16%. Professor Ken Kamrin from MIT will receive the 2016 JAM Award.

Yonggang Huang
Editor, Journal of Applied Mechanics

The Journal of Applied Mechanics Award

The Journal of Applied Mechanics Award is provided by the Applied Mechanics Division of the American Society of Mechanical Engineers to honor the best paper, which has been published in the Journal of Applied Mechanics during the two calendar years immediately preceding the year of the award. The award will be made annually to the corresponding author of the paper who received their Ph.D. no more than 10 years prior to July 1 of the year of award. Corresponding authors who have yet to receive a Ph.D. may also be considered. The award will be presented at the AMD Honors and Awards Banquet at IMECE. The award is selected by a committee appointed by the Technical Editor of JAM, with the Vice-Chair of the AMD EC as the committee chair. Professor **Ken Kamrin** from MIT will receive the 2016 JAM Award for his paper "*Eulerian Method for Multiphase Interactions of Soft Solid Bodies in Fluids*" (Journal of Applied Mechanics 82(4), 041011).

Applied Mechanics Reviews



Applied Mechanics Reviews (AMR) publishes state-of-the-art surveys and retrospective reviews of theoretical, computational, or experimental advances in the broad areas of applied mechanics and engineering science. Also of interest are original pedagogical treatments of a discipline that could be used in self-study. The journal accepts unsolicited manuscripts, but contributors are encouraged to first complete an author prospectus and forward this to the editor for initial editorial evaluation. There are no page limits or page charges for papers published in Applied Mechanics Reviews. Authors should expect a quick turn-around between initial submission and editorial

decision, especially if submission is preceded by correspondence with the editor or members of the editorial board during the development of a manuscript.

In 2015, Applied Mechanics Reviews published 6 issues, totaling 323 pages. Recent publications include:

1. Chanda *et al.*, "[Computational Modeling of the Female Pelvic Support Structures and Organs to Understand the Mechanism of Pelvic Organ Prolapse: A Review](#)"
2. Meiburg *et al.*, "[Modeling Gravity and Turbidity Currents: Computational Approaches and Challenges](#)"
3. Brunton and Noack, "[Closed-Loop Turbulence Control: Progress and Challenges](#)"

4. Rega and Lenci, "[A Global Dynamics Perspective for System Safety From Macro- to Nanomechanics: Analysis, Control, and Design Engineering](#)"
5. Fukumoto *et al.*, "[The Contribution of Kawada to the Analytical Solution for the Velocity Induced by a Helical Vortex Filament](#)"
6. Elishakoff *et al.*, "[Celebrating the Centenary of Timoshenko's Study of Effects of Shear Deformation and Rotary Inertia](#)"
7. Emam and Inman, "[A Review on Bistable Composite Laminates for Morphing and Energy Harvesting](#)"
8. dell'Isola *et al.*, "[Synthesis of Fibrous Complex Structures: Designing Microstructure to Deliver Targeted Macroscale Response](#)"
9. de Rooij and Kuhl, "[Constitutive Modeling of Brain Tissue: Current Perspectives](#)"
10. Trivedi *et al.*, "[Numerical Techniques Applied to Hydraulic Turbines: A Perspective Review](#)"

In addition to individual manuscripts solicited by members of the editorial board, as well as unsolicited manuscripts submitted to the Editor, special ongoing initiatives include collections of technical review articles developed in collaboration with the ASME Journals of [Tribology](#) (JTRIB) and [Mechanisms and Robotics](#) (JMR).

The 2014 InCites™ Journal Citation Reports statistics for AMR show a total of 2,573 citations in 2014 with an immediacy index of 1.5. The journal two-year impact factor without self-citations is 2.647. Its 5-year impact factor is 3.928.

The **AMR Podcast** series, launched in 2014 by Applied Mechanics Reviews and the ASME Digital Collection, features full-length, edited audio interviews with members of the applied mechanics and engineering science research community. The interviews contain informal conversations on topics ranging from a professional career in science and academia to personal reflections on research funding, scientific dissemination, and the contributions of applied mechanics to engineering technology. The podcast repository, available at the ASME Digital Collection at

<http://appliedmechanicsreviews.asmedigitalcollection.asme.org/podcasts.aspx>

and on iTunes at

<https://itunes.apple.com/us/podcast/asme-amr-podcasts/id1078670485?mt=2>

includes interviews with Avram Bar-Cohen, David Barnett, Markus Buehler, Howard Stone, Joe Goddard, Anthony Bloch, Karl-Johan Åström, Irene Beyerlein, Philip Holmes, Stuart Antman, Katia Bertoldi, Zhigang Suo, Edwin Kreuzer, Igor Mezic, Julia Greer, Melany Hunt, Gabor Stepan, Thomas Hughes, and Rodney Clifton. Interviews may be listened to online or downloaded for offline use.

Applied Mechanics Reviews is served by an editorial board of *Section Editors* (SEs) and *Associate Editors* (AEs). Section Editors serve as lead sources of creativity and initiative and work closely with the Editor to ensure the integrity and quality of the journal. Associate Editors handle the review process and collaborate with the Editor in soliciting invited contributions to the journal. The following members of the Editorial Board concluded their terms in 2015 and the first half of 2016: Ellen Arruda (SE), Matthew Begley (SE), Gianluca Iaccarino (AE), Toshio Nakamura (AE), Christine Ortiz (SE), Bart Prorok (AE), Prashant Purohit (AE), K.T. Ramesh (SE), James Riley (AE), and Chin An Tan (AE). New additions to the Editorial Board during this period include Samit Roy (The University of Alabama) (SE). There are several openings on the editorial board in the areas of dynamics, vibration, structures, composite materials, and mechanisms. Interested candidates should contact the editor.

Applied Mechanics Reviews welcomes collaboration in service of the applied mechanics community and continued engagement with its contributors and readers in maintaining high standards of significance, quality and impact.

Harry Dankowicz
Editor, Applied Mechanics Reviews

OTHER ASME-AMD AWARDS

Eshelby Mechanics Award for Young Faculty

The recipient of the 2015 Eshelby Mechanics Award for Young Faculty is Professor **Ken Kamrin** from MIT. The award was formally presented at the AMD Honors and Awards Banquet at IMECE 2015. This award is given annually to rapidly emerging junior faculty who exemplify the creative use and development of mechanics. The intent of the award is to promote the field of mechanics, especially among young researchers. The selection committee consisted of: K. Ravi-Chandar (UT Austin), Huajian Gao (Brown University), Kaushik Bhattacharya (Caltech), Roger Fosdick (University of Minnesota), and Yonggang Huang (Northwestern University). The award consists of a \$ 1,500 cash prize and a commemorative plaque.

OTHER NEWS

Conference Announcements 2016/2017

The **24th International Congress of Theoretical and Applied Mechanics (ICTAM)** will take place in Montreal, Canada from August 21-26, 2016. During the congress, which will feature six minisymposia and 44 thematic sessions on solid and fluid mechanics, the 2016 *Batchelor Prize* will be awarded to Raymond E. Goldstein, and the 2016 *Rodney Hill Prize in Solid Mechanics* to Raymond Ogden. The technical program is now available on the ICTAM [conference website](#).

The **53rd Society of Engineering Science (SES) Technical Annual Meeting** will be held in College Park, Maryland from October 2-5, 2016. The meeting attracted an unprecedented number of abstracts (approximately 700) and will honor J.N. Reddy with the *Prager Medal*, Gang Chen with the *Eringen Medal*, and Mory Gharib with the *G.I. Taylor Medal*. More information can be found on the SES [conference website](#).

The **14th US National Congress of Computational Mechanics (USNCCM)** will be held in Montreal, Canada from July 17-20, 2017. Conference details may be found on the meeting's [website](#).

The 2017 Annual Meeting of the **Society of Experimental Mechanics (SEM)** will take place from June 12–15, 2017 in Indianapolis, IN.

2016 Haythornthwaite Research Initiation Grant Proposals

With funding from the Haythornthwaite Foundation, the Executive Committee of the Applied Mechanics Division is soliciting proposal for the **Haythornthwaite Research Initiation Grant** Program, targeting university faculty engaged in research in theoretical and applied mechanics that are at the beginning of their academic careers. Proposals will be due by *August 15, 2016*. Further information can be found online in the [program announcement](#).