



ANNUAL REPORT TO THE EMI MEMBERSHIP FOR FY 2013

The purpose of this report is to present to the EMI membership a summary of the Institute's activities and progress during the period of October 1, 2012 to September 30, 2013 (FY 2013), as specified by article 9.3.1 of the EMI bylaws:

"Additional Duties of the President. The President, on behalf of the Board of Governors, shall prepare and distribute to the membership an Annual Report for the preceding fiscal year [...]"

Governance

Following the election held in the summer of 2012, J.S. Chen, Ph.D., F.EMI (UCLA) joined the EMI Board of Governors to replace George Voyiadjis, Ph.D., F.ASCE, F.EMI (Louisiana State University). Roger Ghanem, Ph.D., F.EMI (University of Southern California) was elected by the new EMI Board to serve a second year as the EMI President.

Over the summer of 2013, EMI conducted an election for two open positions on the EMI Board of Governors for FY 2014. Muhammad Hajj, Ph.D. (Virginia Tech) and Ning Lu, Ph.D., F.ASCE (Colorado School of Mines) were elected to replace Franz Ulm, Ph.D., F.EMI (M.I.T) and Alex Cheng, Ph.D., F.EMI (University of Mississippi). The EMI Board of Governors elected Roberto Ballarini Ph.D., P.E., F.EMI (University of Minnesota) to serve as President in FY 2014. Roger Ghanem will serve as Past President in FY 2014. Hayley H. Shen, Ph.D., F.EMI (Clarkson University) will step down as the ASCE-appointed Governor. She will be replaced by Dan Frangopol, Ph.D., P.E., F.SEI, F.EMI, Dist.M.ASCE (Lehigh University).

Many thanks to the outgoing members of the EMI Board for their years of dedicated service to the Institute, and welcome to the new EMI Governors!

Membership

There are two ways of becoming an EMI member: members can join ASCE and select EMI as one of their Institutes (ASCE/EMI membership), or they may choose to be members of EMI only (EMI-only membership). EMI membership provides: member discount on EMI publications, EMI journals subscriptions, and EMI conference and webinar registrations; the ability to nominate members for elected positions on the EMI Board of Governors, to vote in EMI elections, and apply to join EMI

technical committees; a subscription to the EMI newsletter; and access to valuable resources and information on the EMI website.

It should be emphasized however that the main reason for becoming a member of EMI is the desire to become part of a community that one identifies with, and wants to interact with and contribute to.

Membership dues have been kept at same level since the start of EMI in FY 2008:

- \$80 per calendar year for EMI-only members;
- \$25 for EMI-only (graduate) student members;
- For ASCE members, free as the first Institute and \$30 after the first Institute.

A discount on the membership dues is provided to members residing in certain countries based on the [World Bank classification](#). On-line membership applications are available for [ASCE/EMI membership](#) and for [EMI-only membership](#). EMI also has a [member referral program](#).

EMI pursued its efforts to attract and retain younger members through low membership fees for graduate students, student competitions, and the recently established EMI Leonardo da Vinci award. EMI membership numbers remained stable (about 2,100), with members in 63 countries, 24% of them students, and over 90% in academia or research. EMI counts 10 Distinguished Members of ASCE among its members.

Publications

EMI is proud of its new publications which will help disseminate important new knowledge and engage the membership of the Institute.

The second volume of the *Lecture Notes in Mechanics* series, [Stochastic Models of Uncertainties in Computational Mechanics](#) by Prof. Christian Soize, Ph.D. (Université Paris-Est), was published in October. The manuscript of a third volume, *Why Are There No Monsters on Earth?* by Prof. Franz Ulm, Ph.D., P.E. (MIT), is currently being finalized. Six additional volumes in the series are under preparation. All volumes in the series will be published as printed books and will also be available as DRM-free eBooks. Many thanks to Prof. Roger Ghanem, Editor of the *Lecture Notes in Mechanics* series for his efforts to start and lead the LNMech series! Prof. Franz Ulm will replace him as Editor of the series.

The second volume in the *Trends in Engineering Special Publications* series, [Coastal Hazards](#), edited by Wenrui Huang, Ph.D. (Florida State University), Ken-han Wang (University of Houston) and Qin Jim Chen (Louisiana State University) was published in January.

EMI also published [Poromechanics V](#), proceedings of the Fifth BIOT Conference on Poromechanics held at the Vienna University of Technology in July in Vienna, Austria, edited by Christian Hellmich, Bernhard Pichler and Dietmar Adam and [Mechanics and Physics of Creep, Shrinkage and Durability of Concrete](#), proceedings of the CONCREEP-9 Conference held in September at M.I.T., edited by Franz Ulm, Hamlin Jennings and Roland Pellenq.

Professor Kaspar Willam, Ph.D., NAE (University of Houston) has been serving as the Editor of the monthly [Journal of Engineering Mechanics](#), the flagship journal of EMI, since the fall of 2010. In order to reduce the time to publication, the EMI Board of Governors appointed Roberto Ballarini, Ph.D., P.E., F.EMI (University of Minnesota) as Co-Editor of *JEM*. Several new Associate Editors joined the *JEM* Editorial Board. The number of papers submitted for publication remains high and the acceptance rate is stable. With the author's permission, articles that receive final acceptance are posted on-line ahead of print in their non-copy edited form within 72 hours, together with their digital object identifier (d.o.i.). Three special issues were published in March (Experimental Methods in Damage Detection and Wind Engineering, edited by Asad Esmaeily), June (Dynamics and Analysis of Large Structures, edited by Andrew Smyth and Raimondo Betti), and August (Stability of Composite Structures, edited by Noël Challamel and Pizhong Qiao). Additional special issues of *JEM* are in preparation, including Identification and Updating of Structural Dynamics Systems (edited by Roger Ghanem). The statistics for the time from submission to final acceptance have sharply improved. The impact factor of *JEM* increased, and its h-index shows it is a very influential journal. Many thanks to outgoing *JEM* Editor Kaspar Willam and *JEM* Associate Editor Pierre-Yves Hicher!

Prof. George Voyiadjis, Ph.D., F.ASCE (Louisiana State University) is the Editor of the quarterly [Journal of Nanomechanics and Micromechanics](#) launched in 2011. Three special issues of *JNM* are in preparation: Mechanics of Nanomaterials (Xi Chen); and Multiscale Characterization, Modeling and Simulation of Stone-based Infrastructure Materials (Linbing Wang) and Multiscale Modeling and Simulation of Physical Phenomena of Material Systems (Lee, Wang, and Chen).

Links to the table of contents of the two EMI journals are regularly included in the monthly EMI newsletter, and members may subscribe to e-mail alerts for the journals table of contents. E-mail delivery of table of contents alerts for ASCE or EMI journals may be activated by visiting http://ascelibrary.org/mytools/table_of_contents_alerts_email. One may also subscribe to the RSS feeds of ASCE or EMI journals and have titles, authors, and citation data for newly published articles delivered directly to one's desktop by visiting http://ascelibrary.org/mytools/rss_feeds.

Conferences

Prof. Gianluca Cusatis, Ph.D. (Northwestern University) chaired the EMI 2013 Conference ([EMI 2013](#)) held on August 4-7, 2013 at Northwestern University in Evanston, Illinois. A total of nearly 500 people attended the event. The [technical program](#) featured ten parallel tracks to accommodate approximately 500 presentations. Social events at the conference included a welcome reception, a banquet and award presentation ceremony, and a farewell reception.

The conference featured six keynote lectures using a new format where the 45-minute keynote lecturer's presentation was followed by questions and comments from a panel of 3 experts, leaving a few minutes for questions from the attendees. The topics covered included:

- Tail-Equivalent Linearization in Nonlinear Stochastic Dynamics (Prof. Armen Der Kiureghian, University of California, Berkeley)

- On Nanomaterial Transport in the Subsurface: Emerging Pollutants and Novel Characterization Tools (Prof. Linda Abriola, Tufts University)
- Violent Flows and GPUs (Prof. Robert Dalrymple, Johns Hopkins University)
- Concrete in the Era of Sustainability: New Opportunities for Materials Characterization (Prof. Kimberly Kurtis, Georgia Institute of Technology)
- Innovative Inverse Analysis Procedures for Mechanical Characterization of Materials and Diagnosis of Structures (Prof. Giulio Maier, Politecnico di Milano, Italy)
- Cement: A Multi-scale Porous Material Under the Nanoscope (Professor Roland Pellenq, Massachusetts Institute of Technology)

The six keynote lectures were recorded, and after editing, the videos will be posted on the EMI web site. In addition to the morning and afternoon plenary keynotes, track keynotes were added to the program to provide an introduction and overview of the tracks' topics.

Three student competitions were organized by the Probabilistic Mechanics, Computational Mechanics, and Structural Health Monitoring and Control committees of EMI.

New at this conference was the use of the Conference4me app for iOS and Android smartphones to provide access to the technical program, including the abstracts and to allow attendees to create a personal agenda. Another innovation at the conference was the short course on "Mechanics of Random and Fractal Materials and Structures" given by Prof. Martin Ostoja-Starzewski (University of Illinois at Urbana-Champaign). The course was recorded on video and will be offered as a video-on-demand short course through ASCE's Continuing Education services.

With the exception of the Poromechanics Committee which held its meeting in July at the BIOT-5 Conference on Poromechanics, all the EMI technical committees held their annual meeting at the conference, as did the EMI Communications Committee and the EMI Board of Governors.

The award ceremony included the presentation of medals to the winners of the Biot (Prof. Patrick Selvadurai, Ph.D., DSc. FRSC, FCSCE, P.Eng., McGill University), Newmark (Prof. Somnath Ghosh, Ph.D., M.ASCE, Johns Hopkins University), Housner (Prof. Tsu T. Soong, Ph.D., P.E., F.ASCE, University at Buffalo) and von Kármán (Prof. Wilfred (Bill) D. Iwan, Ph.D., Dist.M.ASCE, NAE) awards.

The award ceremony also featured the recognition of the first group of EMI Fellows: the recipients of Society awards administered by EMI, and the members who served on the Executive Committee of the former Engineering Mechanics Division or on the Board of Governors of the Engineering Mechanics Institute. (See below a group photo of the new Fellows of EMI present at the event.)

Many attendees took advantage of the special offer on the occasion of the conference to become EMI members. By all accounts, the EMI 2013 conference was a resounding success. A photo gallery of the EMI 2013 conference and associated activities is posted on the EMI web site. Many thanks to Prof. Gianluca Cusatis of Northwestern University and his team for organizing and hosting this outstanding event!

EMI is now planning the 2014 EMI Conference to be held on August 5-8, 2014 at McMaster University in Hamilton, Ontario, Canada, and chaired by Prof. Samir Chidiac.

EMI also took part in the organization of [BIOT-5](#), the very successful Fifth Conference on Poromechanics held on July 10-12, 2013 at the Vienna University Technology, in Vienna, Austria, chaired by Prof. Christian Hellmich, Director of the Institute for Mechanics of Materials and Structures. This partnership strengthened the relationship between EMI and the BIOT conference series and provided to EMI a start in international activities.



L to R: J.S. Chen, Lori Brady, Leon Keer, John Rudnicki, Tsu T. Soong, Alex Cheng, Andrew Smyth, Hayley Shen, Armen der Kiureghian, Kaspar Willam, Zdeněk P. Bažant, Bill Iwan, Dan Frangopol, and Roberto Ballarini.

Local Activities

The Engineering Mechanics Committee of the ASCE Met Section organized two major events at Columbia University: the 2012 Biot Lecture, presented by Prof. Patrick Selvadurai, Ph.D., DSc. FRSC, FCSCE, P.Eng., McGill University on November 19 2012, titled “Contact and Inclusion Problems in Poromechanics” and the 2013 Mindlin Lecture, presented by Prof. Thomas J.R. Hughes (University of Texas at Austin) on April 25, 2013, titled “Isogeometric Analysis” The videos of these and other lectures are posted on the EMI website at <http://www.asce.org/emi/About-EMI/Links-of-Interest/>.

Continuing Education

EMI offered its first webinar on October 18. Prof. Markus Buehler, Ph.D. (M.I.T.) presented “Failure of Molecules, Bones, and the Earth Itself: Nanotechnology and Bio-inspired Materials in Civil Engineering.” EMI is actively soliciting proposals for new webinars.

The short course on “Mechanics of Random and Fractal Materials and Structures” given by Prof. Martin Ostoja-Starzewski (University of Illinois at Urbana-Champaign) was recorded on video and will be offered as a video-on-demand short course through ASCE’s Continuing Education services.

Awards

EMI expanded its extensive [awards program](#) with the creation of the Masanobu Shinozuka Stochastic Systems Medal which may be presented in odd years, starting in 2015.

The winners of four prestigious Society Awards were recognized on August 6 at the Awards Banquet and award presentation ceremony of the EMI 2013 Conference:

2013 NATHAN M. NEWMARK MEDAL

Somnath Ghosh, Ph.D., M.ASCE (Johns Hopkins University) was awarded the Nathan M. Newmark Medal *"for outstanding contributions to the field of computational mechanics of materials and structures, especially in image-based micromechanics and spatial and temporal multi-scale mechanics, and for sustained ambassadorship across the structural and materials engineering communities."*

2013 MAURICE A. BIOT MEDAL

Patrick Selvadurai, Ph.D., DSc. FRSC, FCSCE, P.Eng. (McGill University) was awarded the Maurice A. Biot Medal *"for seminal contributions to the development of mathematical solutions, computational models, and experimental simulations of poromechanics phenomena with relevance to geomaterials and environmental geomechanics problems."*

2013 THEODORE VON KÁRMÁN MEDAL

Wilfred (Bill) D. Iwan, Ph.D., Dist.M.ASCE, NAE (Caltech) was awarded the Theodore von Karman Medal *"for thematically rich engineering mechanics contributions to analysis and design of critical systems and structures under adverse dynamic loads, for stellar mentorship of numerous students, and for exemplary leadership in aseismic societal preparedness."*

2013 GEORGE W. HOUSNER STRUCTURAL CONTROL AND MONITORING MEDAL

Tsu T. Soong, Ph.D., P.E., F.ASCE (University at Buffalo) was awarded the George W. Housner Structural Control and Monitoring Medal *"for pioneering contributions to the field of structural control and monitoring of civil infrastructure systems."*

The 2013 JACK E. CERMAK Medal was awarded to Professor William (Bill) H. Melbourne, Emeritus Professor, Monash University, Director and Founder, MEL Consultants Pty. Ltd, and was presented at the 2013 SEI Congress.

The 2013 EMI Leonardo da Vinci Award was presented to Kaushik Dayal, Ph.D. (Carnegie Mellon University) *"for important contributions to understanding far-from-equilibrium molecular dynamics; domain patterns in ferroelectrics; and phase transformations in peridynamics analyses."*

The finalists and the winner of the Student Paper Competitions and of the Student Research Poster Competitions were also presented with certificates:

- Computational Mechanics Poster Competition: Ryan Hurley, Caltech; Utkarsh Mital, Caltech; Jiahao Cheng, Johns Hopkins University; and Arun Gain, University of Illinois, Urbana-Champaign
- Probabilistic Methods Paper Competition: Bing Xue, University of Minnesota; Iris Tien, University of California, Berkeley; and Sourish Chakravarty, University at Buffalo, State University of New York
- Structural Health Monitoring & Control Paper Competition: Patrick Brewick, Columbia University.

Communications

The monthly [EMI newsletter](#) continues to provide timely information to the membership regarding activities of the Institute, upcoming events and deadlines, and other useful information such as the table of contents of the current issues of the EMI journals. The newsletter also features a Research Group Profile that highlights the work of research team. Each RGP presents the problem the team is addressing, its approach, its findings, their impact, a list of selected publications, current research team members, industry partners, and research collaborations.

The [EMI website](#) has a host of useful features, including:

- A carousel slideshow highlighting current research topics in engineering mechanics and providing videos of keynote lectures given at the EMI conference.
- A searchable database of a growing number of [Research Group Profiles](#) (RGPs) that present a snapshot of the research undertaken by EMI members and an explanation of why what they do matters.
- EMI-specific sections on [books and journals](#), [conferences](#), [continuing education](#), [membership](#), [membership benefits](#), and [awards](#).
- An EMI news section.
- [Current](#) and [recent issues](#) of the EMI newsletter.
- A [calendar](#) of EMI events or events of interest to the EMI membership.
- A searchable section on [EMI committees](#) providing automatically updated committee membership rosters and committee charges.
- A page of [links of interest](#), including videos of lectures and keynote presentations
- A [job postings](#) section.
- A [Frequently Asked Questions](#) (FAQs) section specific to EMI.

The site provides additional valuable material such as presentations and videos of keynote lectures given at EMI conferences and other prestigious lectures, archived EMI newsletters, photo galleries of EMI events, etc. The site also includes an [on-line EMI membership application](#) and an [on-line technical committee membership application](#). In addition to these EMI-specific areas, the integration with the ASCE site provides immediate access to other areas of general interest.

Committees

The EMI committees continue to do a phenomenal amount of quality work: they review papers submitted for possible publication in one of the two EMI journals; they organize sessions at the EMI annual conference; some of them also organize student paper or poster competitions at the annual conference. Most EMI committees met at the EMI 2013 conference. Many thanks to all our committee chairs and committee members for their continued support of EMI activities! EMI is grateful to the outgoing committee chairs for their dedication and hard work: Roberto Ballarini (Biomechanics), Kam Tim Chau (Elasticity), Pierre-Yves Hicher (Granular Materials), Richard Regueiro (Modeling Inelasticity Multiscale Behavior), Steven F. Wojtkiewicz, Jr. (Probabilistic Methods), Noel Challamel (Stability), and Jeff Scruggs (Structural Health Monitoring and Control).

Strategic Planning

At the close of its sixth year of existence, EMI is concluding a strategic planning exercise. A SWOT (strengths, weaknesses, opportunities and threats) analysis was done at a meeting of the EMI Board of Governors in February 2012. A survey of over 5,300 members and non-members was conducted in August 2012 to obtain feedback on EMI's performance and to better understand what the engineering mechanics community expects from EMI. This was followed by an EMI Strategic Planning meeting in January 2013 at ASCE Headquarters in Reston, VA. This effort led to the identification of specific goals and objectives for EMI and the preparation of an action plan that will guide the Institute for the next five years or so.

Finances

EMI is required to operate within the financial model of the ASCE Institutes. As such, its main sources of income are membership dues, publications and journal royalties, and net income from conferences and continuing education activities. Its main areas of expenses are: Board and committee operations; Institute operations; and staff salary, fringes and travel. The net result for FY 2013 was a net income of \$17K, with an additional \$6K membership income to be credited in calendar year 2012. This net result for FY 2013 will be added to EMI's reserves which serve both as a "rainy day" fund and a source of funding for new promising initiatives. Overall, EMI's financial situation is very satisfactory.

Looking back at FY 2013, EMI has made significant progress in several areas. EMI is becoming active in local activities, international activities and continuing education, albeit on a small scale. EMI has kept with the tradition of organizing excellent annual conferences and producing content-rich publications. EMI had four new publications in FY 2013. EMI has taken steps to reduce the time to publication for *JEM* and increase submissions to *JNM*. EMI held the very successful EMI 2013 conference and co-organized the very successful BIOT-5 conference. EMI offered a short course and a webinar. EMI added a Society award to its awards program and has continued to provide financial support to the student competitions. EMI has provided new content on its website and kept it up to date. It has also kept its members informed through its newsletter. EMI concluded its strategic planning effort. The EMI membership is now electing members of its Board of Governors on a regular basis and has a say in the governance of the Institute.

EMI is clearly a healthy, productive and vibrant organization which has made considerable progress since its founding six years ago. This is mostly due to the dedication and hard work of its volunteers and the effective support of EMI staff.

In spite of this progress and these accomplishments, EMI needs to improve in other areas: EMI needs to establish better connections to industry and to enhance its continuing education program.

There are many ways EMI members can help the Institute:

- By renewing their membership
- By giving a (tax deductible) voluntary contribution to EMI when renewing their membership
- By encouraging their graduate students and colleagues to join EMI
- By attending the EMI conference
- By getting involved in committee work
- By being responsive to requests for reviews of journal articles
- By suggesting or offering webinars and short courses
- By encouraging organizations they know in industry and government that are users of advanced mechanics to become organizational members of EMI
- By contributing articles to the EMI journals
- By sending short articles, pictures, videos, and announcements for the EMI newsletter and the EMI website, etc.

With strong support, engagement and participation from its members, I am confident that EMI will become stronger and maintain excellence in all of its activities and products and that EMI membership will remain a compelling proposition.

Respectfully submitted,

Roger Ghanem, Ph.D., F.EMI
EMI President, FY 2013