SEM Experimentally Speaking...

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Message from the President

James P. De Clerck, SEM President, 2022-2023

IN THIS ISSUE

FOR MANY OF US, the end of the year is a time for reflecting on the past year and making plans for the next year. This issue of Experimentally Speaking marks the midpoint of my Presidential term, so this seems like a good opportunity to follow suit.

This past year, we held two successful in-person conferences! Our society is financially strong thanks to the staff diligently managing costs and sound decisions by Jon Rogers and Kristen Zimmerman. The project to reconcile society databases kicked-off a few months ago and we expect to start testing in early 2023. The goal of this project is to better understand the preferences and activity of SEM members and conference attendees so we can take specific action to attract, retain and encourage active members.

"While you are doing your own personal reflection on the past year, I encourage you to think about your mentors, colleagues, and students who contributed to our society and nominate them for an SEM Award."

Our journals, *Experimental Mechanics*, *Experimental Techniques*, and *Dynamic Behavior of Materials* continue to do well. We are anxiously awaiting the first impact factor for JDBM! In addition to publishing the state of the art in mechanics, our journals provide a key revenue stream. I thank the editors and reviewers for their service to our society. I encourage all members to prioritize our journals when deciding where to publish your work.

Looking forward, IMAC 41 will be in Austin, Texas on February 13-16. The week will start with three pre-conference courses: Modal Analysis: Theory and Application, Bayesian Estimation: A Tutorial from Batch to Sequential Methods, and Harmonic Balance from Theory to Computational Implementation. The technical program features 91 sessions over the full 4-days. The exhibit hall will have 32 companies demonstrating their products and services.

A new event for IMAC will be a student reception on Monday evening where the Student Ambassadors will share plans for activities to increase student engagement in the conference and our society. Also, in support of inclusion in our society, Julie Harvie will host a panel of SEM members who identify with minority groups to discuss the struggles and successes they experience as engineers.

Hybrid meetings of the SEM Committees (Education, Applications, and Research) will also be new at IMAC 41. The purpose of these in-person/virtual meetings is to bring the membership together to discuss

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From the Directors

WITH THIS MESSAGE, we would like to summarize 2022 and share a few highlights in preparation for IMAC-XLI in Austin, Texas, February 13-16, 2023.

The key elements of our business operations include: Conferences, Membership, Journals, and Publications (proceedings, books, etc.). We are very pleased to tell you that our business operations remained strong throughout the year, in large part to many of your amazing contributions, to the success of our three in-person conferences and to our staff, who worked tirelessly to make your conference experience valuable and fun. The details per line item of business are described below.

We thank you, our SEM family, for attending IMAC, Annual and iDICs 2022. We were able to grow our conference participation and will continue to strive to do so in 2023. Conference technical programs were strong, as were the numbers of first time attendees and student attendees. We look forward to working with our consultants to be able to track conference participation, among many other data metrics, year-on-year, to learn just how many first timers and students become repeat conference attendees, and we will use these data to manage our business as a whole.

Our conferences in 2023 will continue to use the Whova platform and we will be expanding student ambassador program, rolled-out at Annual 2022. We learned that this program was both informative and fun for those who participated in the activities.

IMAC-XLI is shaping up nicely with 4 full days for the technical program, 359 presentations in 23 tracks, three courses and over 200 papers to be published in the IMAC-XLI Springer/Nature conference proceedings. We are also excited to see that over 30 companies will be participating in our conference exposition. Thank you to the session organizers, course instructors, exhibitors and those who submitted to the SEM: Springer/Nature conference proceedings for teeing up IMAC-XLI as an outstanding conference to attend!

Our membership revenue continued to fall in 2022. We expect to see this trend plateau in 2023 as we generate greater interest and attendance in our in-person conferences. Our conference data analysis will also guide new ideas for us to implement to generate greater member/conference participation in society activities, including student symposia.

Our Journals continue to grow in stature and quality under the leadership of our Editors-in-Chief; Alan Zehnder–*Experimental Mechanics* (EM), Jennifer Jordan–*Journal of Dynamic Behavior of Materials* (JDBM) and Bonnie Antoun–*Experimental Techniques* (ET). We are grateful that we are able to offer our members excellent peer-reviewed journals to publish in whether they attend our IMAC or Annual conference. If you are interested in becoming a journal reviewer or editor, please reach out to Alan, Jen or Bonnie. We welcome your input and will be working with the TD leadership over the next few years to grow our reviewer pool. The revenues from the journals continues to increase adding substantially to the business bottom line. A special thank you to Alan, Jennifer and Bonnie for their exceptional leadership!

Our conference proceedings are also contributing substantially to the business revenues. Our current contract with Springer/Nature garners $2,000 to the Society per volume published. Thank you to all of you that agree to submit your work to the SEM: Springer/Nature conference proceedings. Your proceedings contribution does not preclude you from publishing in a peer-reviewed journal, especially one of SEM's three journals. Self-plagiarism is not allowed, but extension of your proceedings publication into a journal article, with proper citation of your previously published work, is highly encouraged.

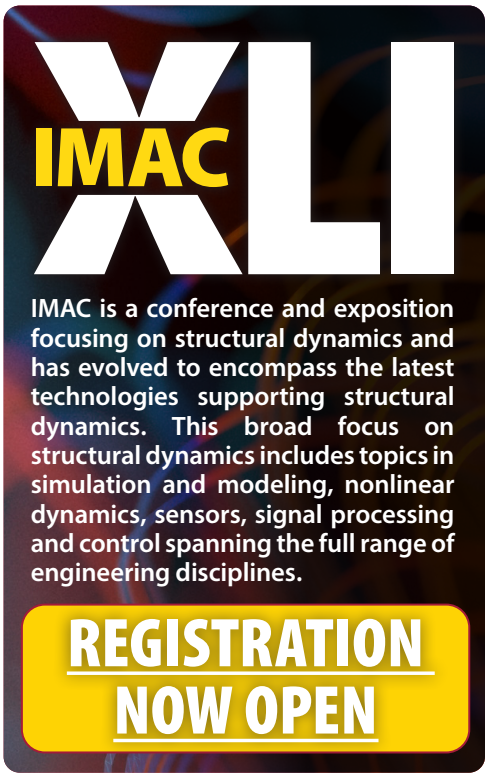
Our SEM Series of Handbooks being published by Springer/Nature is off and running with contributions being planned from a few of our Technical Divisions (Thermomechanics and Infrared Imaging, Dynamic Behavior of Materials and Residual Stress). Thank you all for your invaluable contributions to the Society!

In closing, we want to acknowledge the SEM staff for their dedication to making SEM the best it can be. Our goal will continue to be to give our SEM family and community a valuable, learning and sharing experience and platform through our conferences, our journals/publications, our student symposia activities and through our membership that allow all to stay connected between conferences. We invite you to send an email to Jen, Shari, Dan and Nicole to acknowledge the work that they do on your behalf and on behalf of SEM. Thank You!!

We look forward to your questions and comments so please don't hesitate to email or call.

Happy and Safe Holidays to all!

Kristin Zimmerman, Executive Director
Nuno Lopes, Managing Director



IMAC-XLI Pre-Conference Courses

We look forward to seeing you at IMAC-XLI. Enhance your Conference experience by attending one of the following pre-conference courses. Got to www.sem.org/imac to register and make the most of your IMAC experience.

Modal Analysis: Theory and Application

Course Description:
Modal analysis theory, modal test methods, modal parameter estimation and applications are explored in this intensive two-day course by distinguished lecturers in this field. Lectures will be reinforced with demonstrations and/or videos as lecture material is discussed. This format provides immediate comprehension and understanding of the theoretical and practical aspects of modal analysis methods. At the completion of this course you will have an understanding of modal analysis theory, experimental techniques and potential applications. Based upon the time limitations, the course will only focus on providing an overview of the subject material. Demonstrations will include excitation techniques, parameter estimation techniques and some advanced processing of data.

Instructors: Pete Avitabile, Randy Allemang
Date/Time: Saturday-Sunday, February 11-12, 2023,
9:00 a.m. – 6:00 p.m.
Cost: $1000/$500 student

Harmonic Balance from Theory to Computational Implementation

Course Description:
This course presents an introduction to Harmonic Balance, covering the theoretical basis, its application to mechanical systems, its computational implementation, its advantages over alternative methods and its limitations. The lecture units are accompanied by hands-on computer sessions showing and training the use of the open-source Matlab tool NIvib. Harmonic Balance is an approximation method for the computation of periodic solutions of nonlinear ordinary and differential-algebraic equations. It outperforms numerical forward integration in terms of computational efficiency often by several orders of magnitude. The method is widely used in the analysis of nonlinear systems, including structures, fluid sand electric circuits. In the past few years, Harmonic Balance and its computational implementation in the tool NIvib receive increasing attention in the international (nonlinear) structural dynamics and vibrations community.

Instructors: Malte Krack, Johann Gross, Rob Kuether
Date/Time: Sunday, February 12, 2023, 9:00 a.m. – 6:00 p.m.
Cost: $500/$250 student

Bayesian Estimation: a Tutorial from Batch to Sequential Methods

Course Description (Day 1):
In simulations of complex physical systems, uncertainties arise from imperfections in the mathematical models introduced to represent the systems and their interactions with the environment. Such uncertainties lead to significant uncertainties in the predictions using simulations. Since such predictions form the basis for making decisions, the knowledge of these uncertainties is very important. The course will present Bayesian inference and batch Bayesian model updating framework, the associated computational tools, and selected applications, along with the main challenges for quantifying and propagating uncertainties in complex structural dynamic simulations.

Course Description (Day 2):
During this day, the course offers a thorough review of recursive Bayesian estimation methods. It offers a rigorous theoretical overview of fundamental concepts, along with numerical analysis tools demonstrated on both toy examples, as well as actual-scale monitoring applications. The course covers state, input, and parameter estimation for engineered systems in presence of measurement and modelling uncertainties. Analytic methods for verification of stability, identifiability, and observability of states, inputs, and parameters are covered. The course aims in providing the attendees with a solid understanding of the potential of recursive Bayesian filters, as well as their limitations.

Instructors: Babak Moaveni, Costas Papadimitriou, Eleni Chatzi, Yashar Eftekhar Azam, Vasilis Dertimanis
Date/Time: Saturday-Sunday, February 11-12, 2023,
9:00 a.m. – 5:00 p.m.
(Instructors requested 8:30 a.m. – 4:30 p.m.)
Cost: $1000/$500 student

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topics important to the future of the society. Information on how and when to participate will be on the committee websites and on the Whova app for IMAC attendees. Some Technical Divisions that span across structural dynamics and mechanics will also have hybrid meetings. Check your TD websites for more information.

A few months after IMAC, we will return to the Rosen Plaza in Orlando for Annual, June 5-8. Over 400 abstracts were submitted. So far, the technical program features a career panel, three symposia and eleven technical tracks.

While you are doing your own personal reflection on the past year, I encourage you to think about your mentors, colleagues, and students who contributed to our society and nominate them for an SEM Award. You will find a full list on the AWARDS tab of the SEM website, where you will also find links to nomination forms. Nomination packets are due April 15. Help SEM recognize outstanding contributors through your nomination.

Finally, I wish you and yours a safe and happy holiday season. I am looking forward to seeing you in Austin and Orlando next year.

Jim De Clerck
SEM President 2022-2023 ■

MARK YOUR CALENDARS!

IMAC-XLI

FEBRUARY 13-16, 2023 | RENAISSANCE AUSTIN HOTEL | AUSTIN, TX

2023 SEM ANNUAL

JUNE -5-8, 2023 | ROSEN PLAZA HOTEL | ORLANDO, FL

2023 SEM Executive Board Nominees

The SEM Nominating Committee has announced the following updates for the 2023–2024 SEM Executive Board. Biographies for each member appear in this article. Once elected, these members will join current Board members whose terms extend to 2024.

PRESIDENT
Raman P. Singh

Dr. Raman P. Singh serves as the Associate Dean for Engineering at OSU-Tulsa and as the Head of the School of Materials Science and Engineering in the College of Engineering, Architecture and Technology at Oklahoma State University (OSU). He also serves as the Director of the Helmerich Advanced Technology Research Center on the OSU-Tulsa campus and is appointed as the Helmerich Family Endowed Chair Professor of Engineering.

Raman holds M.S. and Ph.D. degrees in Mechanical Engineering and Ap-plied Mechanics from the University of Rhode Island, and a B.Tech. degree in Mechanical Engineering from the Indian Institute of Technology–Kanpur, India. Prior to joining OSU in 2006 he was a faculty member at the State University of New York at Stony Brook, and before that a post-doctoral scholar at the California Institute of Technology.

Raman's academic interests are in student mentorship, development, and re-tention with a focus on new pedagogical methods. His research interests are in the mechanics of advanced materials, with an emphasis on the investigation of modern engineered materials and development of new techniques for mechanical characterization at highly localized length scales. His research has been funded by the National Science Foundation, NASA, the Oklahoma Center for the Ad-vancement of Science & Technology, the Oklahoma Transportation Commission, the US Army Research Office, the Department of Energy, and industry. He has authored or co-authored several archival journal publications and conference proceedings and holds two patents. He is an active member of the Society of Experimental Mechanics (SEM).

PRESIDENT-ELECT
Jason Blough

Dr. Blough received his BSME and MSME from Michigan Technological University. Dr. Blough attended the University of Cincinnati to obtain his Ph.D. in structural dynamics. Dr. Blough's Ph.D. was on rotating machinery signal processing methods. Dr. Blough is currently a Professor in the Mechanical Engineering-Engineering Mechanics Department at Michigan Technological University. Dr. Blough has been active in SEM and IMAC for over 20 years publishing papers, serving on the SEM Executive Board, and continues to be an instructor in the "Young Engineers" program at IMAC. Dr. Blough's research is industry funded, with support from the auto and powersports industries, and defense. Dr. Blough has graduated over 40 graduate students and published over 135 papers. Dr. Blough has taught over 40 short courses to industry on various NVH topics.

VICE-PRESIDENT
Junlan Wang

Junlan Wang is a Professor of Mechanical Engineering and Adjunct Professor of Materials Science and Engineering at the University of Washington. She received her B.S. (1994) and M.S. (1997) in Mechanics and Mechanical Engineering from the University of Science and Technology of China, and Ph.D. (2002) in Theoretical and Applied Mechanics from the University of Illinois at Urbana-Champaign. After a year of postdoctoral research at Brown University, she joined the Mechanical Engineering department of University of California, Riverside in 2003 and moved to University of Washington, Seattle in 2008.

Junlan's research focuses on mechanics of thin films/multilayers, biological and bioinspired materials, high strain rate behavior, and additively manufactured materials. She has received a number of awards and recognitions, including an NSF CAREER Award (2008), SEM Hetenyi (2004), Durelli (2016) and Frocht (2020) Awards, ASEE Beer and Johnston Outstanding New Mechanics Educator award (2007), ASME Certificate of Recognition for Outstanding Services (2015) and ASME Fellow (2020). Within SEM, she has served as Secretary, Vice-Chair and Chair of the Research Committee (2011-2017), organizer of Track 5 (Mechanics of Additive and Advanced Manufacturing) for the 2017 and 2018 SEM Annual, Associate Editor for Experimental Mechanics (2015-present), and the Executive Board (2020-2022). She has also served in multiple leadership roles in the American Society of Mechanical Engineers (ASME), including Chair of ASME Applied Mechanics Division (AMD) Experimental Mechanics Committee (2008-2010) and Materials Division (MD) Multifunctional Materials Committee (2006-2008), Member of the MD Executive Committee (2010-2015; Chair 2014-2015), General Conference Chair of the joint ASME AMD-MD Mechanics and Materials Summer Conference (McMat 2015), and Associate Editor for Journal of Applied Mechanics (2016-2018).

2023 SEM Executive Board Nominees continued from pg.5

MEMBER-AT-LARGE
Martha Grady

Dr. Martha E. Grady (Meg) is an Associate Professor at the University of Kentucky in Lexington, KY, USA. She obtained a Bachelor's degree in Mechanical Engineering from University of Central Florida, Masters and PhD degrees in Theoretical and Applied Mechanics from University of Illinois at Urbana-Champaign, and spent two years at the University of Pennsylvania as a Postdoctoral Fellow before beginning her faculty appointment in 2016. She is a past chair of the Biological Systems and Materials technical division and current chair of the Education Committee for the Society for Experimental Mechanics. She was awarded the UCF MAE Alumni Young Engineer Award in 2015, the NSF CAREER Award in 2021, and the UK College of Engineering Excellence in Research Award in 2022. Her research is supported by NSF, NIH, and NASA. Her research interests lie at the intersection of materials, deformation mechanics, and medical interfaces.

MEMBER-AT-LARGE
Sharlotte Kramer

Dr. Sharlotte Kramer is a research lead of the Structural Mechanics Laboratory at Sandia National Laboratories. She leads a research program in the Engineering Science Center that advances predictive solid mechanics for rapid transformation of qualification and sustainment of national security systems. She is the principal investigator of multi-disciplinary projects, transitioning fundamental research to mission applications at the intersection of solid mechanics, materials science, computer science, and data science, with internal Sandia collaborators and external collaborators around the globe.

Sharlotte received her Bachelor's degree in Aerospace Engineering from the University of Virginia with Ioannis Chasiotis and her Master's and Ph.D. degrees in Aeronautics from the California Institute of Technology with G. Ravichandran. She was a postdoctoral researcher in Materials Science and Engineering at the University of Illinois at Urbana-Champaign with Nancy Sottos before joining Sandia National Laboratories. She has been a member of the Society of Experimental Mechanics since 2007. She is the founding chair of the SEM Additive and Advanced Manufacturing Technical Division and has served as the chair of the Research Committee and the Inverse Problem Methodologies Technical Division.

MEMBER-AT-LARGE
Hae Young Noh

Hae Young Noh is an Associate Professor in the Department of Civil and Environmental Engineering at Stanford University. Her research focuses on indirect sensing and physics-guided data analytics to enable low-cost non-intrusive monitoring of human-structure systems. She is particularly interested in developing structures to be self-, user-, and surrounding-aware to improve users' quality of life and provide safe and sustainable built environments. The results of her work have been deployed in a number of real-world applications from trains, to the Amish community, to eldercare centers, to pig farms. Before joining Stanford, she was a faculty member at Carnegie Mellon University. She received her Ph.D. and M.S. degrees in Civil and Environmental Engineering and her second M.S. degree in Electrical Engineering at Stanford University. She earned her B.S. degree in Mechanical and Aerospace Engineering at Cornell University. She received several awards, including the Google Faculty Research Awards (2013, 2016), the Dean's Early Career Fellow (2018), the NSF CAREER Award (2017), and various Best Paper Awards from ASCE, ASME, ACM, IEEE, and SEM conferences.

MEMBER-AT-LARGE
Maarten van der Seijs

During my studies Mechanical Engineering at TU Delft (2005-2011) I was greatly inspired by Prof. Daniel Rixen and Dennis De Klerk to pursue a career in structural dynamics. I started my PhD in 2011, as a col-laboration project between TU Delft, TU München and BMW Group, and have been visiting IMAC con-ferences since 2012. During that time, I have specialized in Experimental Dynamic Substructuring and Transfer Path Analysis, with application in automotive noise and vibration engineering.

Along with receiving my PhD in 2016, I co-founded VIBES. technology, a Dutch start-up company with a mission to bring these methods into industry. As VIBES has grown into a software-focused company and a breeding ground for innovation, I find that our research interests align well with the activities of SEM. In my role as head of software and technology, I have a strong interest in bringing researchers and industrial parties closer together and make sure that promising substructuring and TPA technology finds its way into standard R&D processes. ■

Upcoming Events

2023

IMAC-XLI | **February 13-16, 2023**
Renaissance Austin Hotel
Austin, TX USA

2023 SEM Annual Conference | **June 5-8, 2023**
Rosen Plaza Hotel
Orlando, FL USA

2024

IMAC-XLII | **Jan. 29–Feb. 1, 2024**
Rosen Plaza Hotel
Orlando, FL USA

2024 SEM Annual Conference | **June 3–6, 2024**
Hilton Vancouver Washington
Vancouver, WA USA

2025

IMAC-XLIII | **Feb. 8–11, 2025**
Rosen Plaza Hotel
Orlando, FL USA

2025 SEM Annual Conference | **June 2–5, 2025**
Hyatt Regency Milwaukee
Milwaukee, WI USA