

Newsletter of the U.S. National Committee on Theoretical & Applied Mechanics (USNC/TAM) FALL 2020

Chair's Welcome

Welcome to the USNC/TAM Newsletter! I hope this finds you safe and well during these challenging times. It is an honor to take over as Chair of this storied committee from Ravi-Chandar, who has provided strong and wise leadership under normal operation of the committee as well as in the uncharted waters of the pandemic. We are grateful for his continued wise counsel in his new role as Past Chair, and I would like to extend personal thanks for his gracious mentorship over several years. With the change in committee personnel also comes a goodbye and thank you to Gareth McKinley for his leadership first as Chair (2016-2018) and then Past Chair for the last two years. It's really an "au revoir", since he continues his service to the community as a newly-elected member of the IUTAM Congress Committee. In other committee news, we also note the loss of two stalwarts of the USNC/TAM and IUTAM, [Jan Achenbach](#) and [Paul Steen](#).

In this second edition of the revitalized newsletter, I am pleased to report that the committee has maintained momentum on a range of activities through the changes required by the Covid-19 pandemic, as well as initiating some virtual events. You will find below details of the launch of the USNC/TAM Young Observer Program, plans for the postponed Inaugural USNC/TAM Distinguished Lecture and information on the well-attended webinar on Machine Learning in Mechanics. Planned U.S. participation in the ICTAM meeting in Milan, postponed and now named ICTAM 2020+I, was strong. We actively encourage young researchers in particular to consider submitting abstracts during the short new submission window in November, and also to apply for the newly-established Thomas J. R. Hughes Travel Fellowships.

You can reach the members of the USNC/TAM Executive Committee via email at executivecommittee@usnctam.org. We welcome your comments and suggestions and look forward to working with you to promote the activities of the U.S. mechanics communities on national and international stages.

- Beverley McKeon (USNC/TAM Chair, 2020-2022)

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Report from the Annual Meeting of the USNC/TAM

The annual meeting of the USNC/TAM scheduled for April 17/18, 2020 at the National Academies Building, 500 Constitution Avenue, Washington DC was canceled in early March 2020 due to COVID-19 related travel restrictions. Instead, the meeting was rescheduled as two virtual meetings on the Zoom platform. A short meeting was held on June 19, 2020 to elect the leadership team. The following leadership team was elected for 2020-2022: Chair: Professor Beverley McKeon (California Institute of Technology), Vice-Chair: Professor Horacio Espinosa (Northwestern University), Secretary: Professor Linda Franzoni (Duke University) and Past-Chair: Professor Krishnaswamy Ravi-Chandar (University of Texas at Austin). The full annual meeting of the USNC/TAM was held online over two days from 1:00 pm – 5:00 pm EDT on August 27-28, 2020.

The specific technical focus of the half-day meeting on August 27 was on [Machine Learning in Mechanics](#). Technical presentations highlighting machine learning were delivered by Professor Anima Anandkumar (California Institute of Technology) on *AI Algorithms for Mechanics*, Professor Michael Brenner (Harvard University) on *Machine Learning for Partial Differential Equations*, and Professor Markus Buehler (Massachusetts Institute of Technology) on *Bioinspired Materials by Design using AI*. The presentations were streamed live; an audience of nearly 400 participants, composed of graduate students, and academic and industrial researchers from the Americas, Europe and Asia watched the session live. Videos of all of the lectures are available [online](#).

The business meeting of the USNC/TAM took place on August 28, 2020, 1:00 pm – 4:30 pm EDT. Society Representatives for each of the Member Societies reported on mechanics-related activities and awards presented over the previous year. In addition, to promote active participation in USNC/TAM, the *Young Observer* program for future leaders in Mechanics-based education and research as described below was inaugurated during the virtual committee meeting.

Report from the General Assembly Meeting of the IUTAM

While the ICTAM 2020 was postponed due to COVID-19, the IUTAM General Assembly meeting was scheduled through videoconferencing, and held on August 25-26, 2020. The USNC/TAM made two nominations to the IUTAM Bureau, two nominations to the Executive Committee of the Congress Committee, and eight nominations to the Congress Committee. Of all of these, four of the US nominees to the Congress Committee were elected. Professors Ellen Arruda (University of Michigan), Cate Brinson (Duke University), Gareth McKinley (MIT) and Kate Stebe (University of Pennsylvania) will serve on the IUTAM Congress Committee and as Ex-Officio voting members of the USNC/TAM for the term 2020-2024. In addition, Professor Nadine Aubry (Tufts University) will continue to serve on the IUTAM Bureau as Vice President for the 2020-2024 term. In addition, Professor Robert McMeeking was elected as a Member-at-Large of the General Assembly for 2020-2024, Professor Ann Karagozian will serve on the Symposia Panel for Fluid Mechanics, and Professor Huajian Gao will serve as Chair of the Symposia Panel for Solid Mechanics. Therefore, the US will continue to hold strong leadership positions within the IUTAM. The USNC/TAM will also continue to make nominations for available IUTAM leadership roles; individuals interested in such positions are encouraged to contact the USNC/TAM leadership for further information.

The US delegation to the General Assembly, in cooperation with the Canadian, Mexican and French delegations, expressed concern at the General Assembly meeting that the membership in the proposed IUTAM Bureau lacked diversity in gender, age and geographical representation. While there was general support for this position, the General Assembly decided to defer action to the following year, with an indication that a committee would be appointed to look into the statutes and offer a path forward. The US delegation will monitor progress on this important matter.

Thomas J.R. Hughes Travel Fellowship Program

The USNC/TAM proudly announced the establishment of a new travel fellowship program. These fellowships, named the **Thomas J. R. Hughes Travel Fellowship from the USNC/TAM** will provide travel support for doctoral and/or post-doctoral students enrolled at universities in the United States to attend the U. S. National Congress for Theoretical and Applied Mechanics or the International Congress of Theoretical and Applied Mechanics. The intent of such fellowships is to attract and recruit qualified individuals into the field of mechanical science and engineering and to broaden participation from underrepresented groups. A total of five fellowships will be awarded to each of these meetings; selections will be made by a subcommittee of the USNC/TAM. We had planned to send the inaugural class of five Hughes Fellows (doctoral and post-doctoral students) to Milan, Italy in August 2020 to present their work at the 25th International Congress of Theoretical and Applied Mechanics. The launch of this program has been delayed to the rescheduled ICTAM 2020+1, scheduled for August 2021. This biennial fellowship program will also support travel fellowships to the US National Congress of Theoretical and Applied Mechanics in 2022 and beyond. A call for applications for the 2020+1 fellowship program for travel to the ICTAM in Milan, Italy will be issued in March 2021.

Launch of the USNC/TAM Young Observer Program

The Young Observer Program was launched in 2019-2020. The objective of the program is that the observers will gain experience of national and international scientific coordination and diplomacy through exposure to the functions and responsibilities of the National Committee, as well as learning about opportunities for further engagement with USNC/TAM. A young professional is considered to be someone who is within 10-15 years of receiving his or her PhD and/or first professional appointment in an engineering or related field. The observer will attend the annual committee meeting and events associated with the committee meeting. The observer will be invited to have dinner with the Committee on Friday night and the hotel accommodation for that night will be covered by the Committee. In 2019, Prof. Sinan Ketan (Northwestern University) was selected as the Young Observer, and he attended the Virtual Annual Meeting held on August 27-28, 2020.

The USNC/TAM invites member professional societies to nominate a young professional to be an observer at its annual committee meeting. Society Representatives should send their nominations to Prof. Linda Franzoni, [Secretary of the USNC/TAM](#), by January 4, 2020 (one nomination per society). The Committee anticipates selecting one or two Observers each year. Nominees and nominators will be notified of the Committee's decision by January 31, 2020.

USNC/TAM Distinguished Lecture Series - Postponed

In November 2019, the USNC/TAM proudly announced the launch of a new series of Distinguished Public Lectures on Theoretical and Applied Mechanics. The objective of this series is to convey the excitement, to stimulate interest, and to discuss opportunities in the mechanical sciences and engineering related to advances in infrastructure, automation, transportation, energy, bio-medicine, sustainability, exploration, and other areas. The targeted audience includes students and teachers interested in STEM fields at high schools across the nation and the general public. The lectures are free and open to the public. They will be streamed live and archived for future use.

The inaugural Lecture in this series by **Dr. Adam D. Steltzner** of NASA's Jet Propulsion Laboratory was scheduled for Friday April 17, 2020 at the Auditorium of the National Academy of Sciences, Engineering and Medicine. Adam holds a PhD in Engineering Mechanics from UW-Madison and is perhaps most widely known for his engineering and outreach work related to the [*Seven Minutes of Terror*](#) associated with landing the Curiosity Rover on Mars in 2012. Unfortunately, due to the pandemic, the inaugural lecture has been postponed to the year 2021; the USNC/TAM will decide on an in-person vs virtual delivery during the Spring of 2021.

Upcoming Conference Dates and Deadlines



The 25th Quadrennial **International Congress on Theoretical and Applied Mechanics** (ICTAM) has been rescheduled as ICTAM 2020+1 and will take place in Milan, Italy, August 22-27, 2020. Paper and posters accepted for the original program in 2020 will automatically be included for the ICTAM 2020+1. In addition, submission of new abstracts for poster+short talks will be accepted from November 1, 2020 – November 30, 2020. Details of the rescheduled ICTAM 2020+1 can be found at the website: <https://www.ictam2020.org/>

Once again the USNC/TAM plans to offer a limited number (~20) of travel fellowships and mentoring programs for young Mechanicians (postdoctoral researchers and assistant professors) who have their papers accepted for presentation (call to be released in March 2021); these are in addition to the Thomas J.R. Hughes Travel Fellowships described above.

The USNC/TAM was responsible for providing reviews of all abstracts submitted to the ICTAM 2020 from authors from the US. Three subcommittees were constituted to perform the reviews over a very tight deadline. Fluids: Gareth McKinley (MIT), Eric Shaqfeh (Stanford), Patrick Underhill (RPI) and Ann Karagozian (UCLA); Fluids/Solids: Robert Koch (NUWC, Chair), Maria Emelianenko (George Mason University), and Jose Andrade (California Institute of Technology); Solids: Yonggang Huang (Northwestern University), Tom Pence (Michigan State University), Vicky Nguyen (Johns Hopkins University), and Ravi-Chandar (University of Texas at Austin). Nearly 300 abstracts from the US were reviewed and accepted for presentation as oral or short talk plus poster presentations. These reviews were used by the International Papers Committee of the ICTAM 2020 to develop the overall program for the Congress.

There were also 8 IUTAM symposia scheduled to take place in 2020 as well as an IUTAM/CISM summer school in Udine. Some of these have been converted to virtual meetings, while others have been postponed to 2021. Details are available at: <https://iutam.org/accueil/>. Symposia proposals for the period 2022/2023 were reviewed by the Fluids and Solids Symposia Panels and approved by the IUTAM General Assembly at the virtual meeting on August 25–26, 2020. No proposals were submitted that originated from the US and so there will not be any IUTAM symposia in the US during 2022/2023. Members are encouraged to develop such proposals for the next round, to be submitted in early 2022. Individuals interested in proposing symposia for the 2024/2025 period should contact Prof. Linda Franzoni, [Secretary of the USNC/TAM](#), for assistance in developing such proposals.

The current plan is that the 19th US National Congress on Theoretical and Applied Mechanics (USNCTAM) will take place as scheduled during June 18-24, 2022 on the campus of The University of Texas at-Austin. Advance details are available from the Conference Co-Chair, Prof [Chad Landis](#).

AmeriMech Symposia

In addition to the IUTAM workshop framework (which offers up to \$5000 towards the costs of organizing a workshop, but which requires 2+ years of advance planning), the USNC/TAM has also developed a faster, more nimble funding mechanism known as *AmeriMech Symposia* to help Mechanics researchers rapidly develop ideas for small, targeted workshops in emergent fields and hot topics. A list of recent AmeriMech Symposia and details of the submission process are available [here](#). Two symposia were held in 2019-2020: [Modeling and Simulation of Fires](#), organized by Tarek Zohdi (UC-Berkeley)

and Ilkay Altintas (UCSD) and [Experimental and Computational Fracture Mechanics: Validating Peridynamics and Phase Field Models for Fracture Prediction and Experimental Design](#), organized by Professor Patrick Diehl (Louisiana State University), Professor Serge Prudhomme (Polytechnique Montréal, Canada) and Dr. Pablo Saleson (Oak Ridge National Laboratory). The deadline for submission for 2021 and 2022 AmeriMech Symposia is March 31, 2021. Please see the above website, and contact the AmeriMech Symposia Chair, Professor [Tarek Zohdi](#) for additional details.

Generous financial support from the Robert M. and Mary Haythornthwaite Foundation to support the AmeriMech Symposia is greatly appreciated.

Recent Trends Reports

The USNC/TAM is pleased to invite proposals for the **Reports on Recent Trends in Mechanics** series. This series has resulted in several reports since 1991 on topics ranging from general computational mechanics, fluid mechanics, mechanics and medicine, additive manufacturing as well as other topical areas. More information on previous reports is available at the [Reports website](#). In 2020, a report on Recent Trends in Fluid Mechanics is being developed by Dr. [Matthew Munson](#), Program Manager for Fluid Mechanics at the Army Research Office.

Researchers and research teams interested in the creation of a new report in a relevant topical area may submit a 250 word proposal to the USNC/TAM review subcommittee ([Thomas Pence](#), [Anne M. Grillet](#), [Richard Neu](#)) via email to all of the above by **March 15, 2021**. Proposals will be reviewed by the subcommittee and confirmed by the full USNC/TAM in April 2021 with decisions for going forward announced by April 30, 2021. Full reports will be due six months later (October 31, 2021) and the full reports will be reviewed by the USNC/TAM prior to publication. Please contact one of the sub-committee members for additional information.

USNC/TAM Member Societies and Officers

Executive Committee (2020-2021)

Chair	Beverley McKeon (Caltech)	Vice Chair	Horacio Espinosa (Northwestern)
Secretary	Linda Franzoni (Duke)	Past Chair	Krishnaswamy Ravi-Chandar (University of Texas at Austin)

Member societies and current representatives

AAM American Academy of Mechanics	Ellen Arruda (University of Michigan)
AIAA American Institute of Aeronautics & Astronautics	Paul Palies (CFD Research Corp)
AICHE American Institute of Chemical Engineers	Patrick Underhill (RPI)
APS American Physical Society	Beverley McKeon (Caltech)
AMS American Mathematical Society	[in process]
ASA Acoustical Society of America	Robert Koch (Naval Undersea Warfare Center)
ASCE American Society of Civil Engineers	Jose Andrade (Caltech)
ASME American Society of Mechanical Engineers	Yonggang Huang (Northwestern University)
ASTM International	Richard Neu (Georgia Tech)
SEM Society for Experimental Mechanics	Wendy Crone (University of Wisconsin, Madison)
SES Society of Engineering Science	Vicky Nguyen (Johns Hopkins University)
SIAM Society for Industrial & Applied Mathematics	Maria Emelianenko (George Mason University)
SOR Society of Rheology	Shelley Anna (Carnegie Mellon University)
USACM U.S. Association for Computational Mechanics	[in process]
Members-at-Large	Tom Pence (Michigan State University)
	Anne Grillet (Sandia National Laboratory)
	Tarek Zohdi (University of California, Berkeley)
	Nicole Sharp (FYFD)

National Academies Staff

Senior Program Officer Ana Ferreras
Staff Support: James Manning

BISO Director Kathy Bailey

About USNC/TAM

The U.S. National Committee on Theoretical and Applied Mechanics (USNC/TAM) represents the United States in national and international activities related to the broad science of mechanics, including related sciences, engineering and mathematics. It serves as a focal point for charting future priorities in mechanics related research, applications and education. It represents the United States in the [International Union of Theoretical and Applied Mechanics \(IUTAM\)](#). For more information regarding USNC/TAM, please refer to the [committee website](#). The USNC/TAM was formed in 1948 and came under the umbrella of the National Academies in 1966. Please send newsletter ideas and suggestions to vicechair@usnctam.org.