

2022 Newsletter of the U.S. National Committee on Theoretical & Applied Mechanics (USNC/TAM)

Chair's Welcome

2022 was an exciting year for the TAM community, we went back to in-person conferences where we could once again meet colleagues face-to-face, share our research findings, participate in award symposia, explore challenges and opportunities in the field of mechanics, and make new acquaintances and friends.

It is an honor to take over as Chair of this committee from **Beverley McKeon**, who has provided exceptional leadership that empowered the committee to achieve new highs. We are grateful for her continued and invaluable participation over the years and her commitment to continue in her new role as Past Chair. I have enjoyed working with Beverley and look forward to her gracious guidance in the coming year. With the change in committee personnel also comes a goodbye and thank you to **K. Ravi-Chandar**, for his leadership and contributions first as Chair (2018-2020) and then Past Chair for the last two years, and to **Linda Franzoni**, for her exceptional and sustained contributions as Secretary for the past 10 years. Both Ravi and Linda have been instrumental in advancing the committee mission and having an influential presence in IUTAM. I would also like to welcome Vice Chair: **Melany Hunt**, Secretary: **Tom Pence**, and Society Coordinator: **Sonya Smith**, all prominent members of our community who have gracefully committed to championing and advancing the USNC/TAM mission.

In the past years, the USNC/TAM has been increasing member participation, advancing diversity, equity, and inclusion, and organizing several activities designed to fulfill its mission: to promote, coordinate and advance all aspects of research in the broad field of mechanics throughout the United States, and to represent the United States in the IUTAM and participate in its activities. This new impetus resulted in the realization that the structure of the Committee needed to evolve in order to provide leadership on both the domestic and international stages. Under the leadership of **Beverley McKeon**, a new committee structure is now in place with the **addition of a society coordinator** (Sonya Smith) to the previous executive committee (chair, vice-chair, past-chair, secretary) and the **establishment of five subcommittees**. The **Diversity and Action subcommittee**: Vicky Nguyen (chair), Horacio Espinosa, Anne Grillet, Sonya Smith; the **Intersociety Coordination subcommittee**: Sonya Smith (chair), Melany Hunt, Rich Neu, Paul Palies, Tom Pence; the **Communications and New Directions subcommittee**: Yuri Bazilevs (chair), Cate Brinson, Arezoo Ardekani, Sam Daly, Horacio Espinosa, Beverley McKeon, Sinan Ketten.; the **Outreach and Education subcommittee**: Nicole Sharp (chair), Maria Emelianenko, Edriss Titi, Patrick Underhill; the **Nominations subcommittee**: Beverley McKeon (chair, ex officio), Horacio Espinosa, Melany Hunt, Tom Pence; and the **Congress Site Selection subcommittee**: Tom Pence (chair), Rich Neu, Yuri Bazilevs, Roger Ghanem, Chad Landis. The new structure will facilitate a more vibrant engagement of committee members, better coordination with all 13 participating societies, the establishment of new outreach activities, the creation of new and better communication tools, the promotion of events to identify and publicize new directions in mechanics, and the advancement of diversity, equity, and inclusion.

There are several ways that non-members of the USNC/TAM can participate in the Subcommittees at the Chair's discretion: nominate an early career researcher as a USNC/TAM Young Observer, engage with the newly established subcommittees on "Communications and New Directions" and "Outreach and Education," propose an AmeriMech workshop or a Webinar, develop a topic for a Recent Trends in Mechanics Report or propose an IUTAM symposium. The 26th International Congress on Theoretical and Applied Mechanics, ICTAM 2024, will be held in Daegu (South Korea) and will commemorate the 100 Anniversary of ICTAM! I encourage you to contribute to the organization of sessions and to submit abstracts when the deadline becomes available. [Check out the promotional video on YouTube.](#)

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 community. I wish you a prosperous and exciting 2023!

- Horacio D. Espinosa (USNC/TAM Chair, 2022-2024)

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Report from the Annual Meeting of the USNC/TAM

The 2022 annual meeting of the USNC/TAM was held on June 19, 2022, at the 2022 USNCTAM in Austin, Texas. The business meeting started with a report from the chair on the new organization of the committee. The new Executive Committee Structure retains the leadership line (Chair, Vice Chair, Secretary and Past Chair), but adds a Society Coordinator who will shadow the Secretary for one term and then become secretary. The terms of appointment remain 2 years for the leadership line and 3 years for Secretary and Society Coordinator. During the annual meeting, the committee elected Tom Pence as Secretary, Melany Hunt as Vice Chair, and Sonya Smith as Society Coordinator. Nicole Sharp was elected member at large (MAL) for another 3-year term and Rick Neu was elected MAL for a 3-year term while retaining his ASTM Society Representative status. Five subcommittees were approved, and membership assigned based on expression of interest.

The US participation in IUTAM continues to be very vibrant, with Nadine Aubry (vice president) and Robert McMeeking (secretary) serving in the bureau, Ellen Arruda, Cate Brinson, Gareth McKinley, Kathleen Stebe serving in the Congress Committee (CC) until 2024, Ellen Longmire serving in the Symposia Panel (Fluids), and Horacio Espinosa serving in the Diversity Advocacy Group (DAG). USNC/TAM also has 5 delegates in the General Assembly, through which it continuously provides input on diversity, and nominates members for the CC, ICTAM opening/closing lectures, sectional lecturers, and chairs for thematic sessions (through the Nominations subcommittee).

As in previous meetings, the committee had a sustained and thoughtful discussion on how to expand access to mechanics, how to strengthen the commitment of the USNC/TAM to diversity, equity, and inclusion, and how to develop effective tools for outreach to the broad community interested in mechanics, leading to some of the initiatives you see described below. Other highlights include approval of the site for the **2026 USNCTAM in Southern California**, to be organized by a consortium of regional universities, USC, UCLA, and Caltech, with Roger Ghanem serving as Chair.

Vice chair Horacio Espinosa reported the activities and recommendations of the ad-hoc Subcommittee on Virtual Activities (Maria Emelianenko, Horacio Espinosa (chair), Ana Ferreras, Nicole Sharp, Tarek Zohdi), which included: i) Launch a campaign in [Pathful Connect](#) or equivalent platform to enable K-12 classroom connectivity (connecting teachers and students to members of our community who can explain science and engineering concepts) and fostering industry chats (webinars/round tables); ii) Launch a worldwide “5 minutes PhD thesis competition,” a one-day event conducted online where recent PhD graduates present their work in 5 minutes. Award prizes to the first three places with instant electronic voting by worldwide audience. These recommendations are being acted upon by the **Outreach and Education subcommittee**, hence, if you are interested in contributing, please contact the subcommittee chair [Nicole Sharp](#).

2022 USNC/TAM Distinguished Lecture



We were delighted to host **Professor Anette (Peko) Hosoi** of the Massachusetts Institute of Technology to deliver the annual USNC/TAM Distinguished Lecture via Zoom on Tuesday, April 19, 2022. Professor Hosoi holds a PhD in Physics, from the University of Chicago, and is the Neil and Jane Pappalardo Professor of Mechanical Engineering at MIT. She is the co-founder of the MIT Sports Lab which connects the MIT community with pro-teams and industry partners to address data and engineering challenges that lie within the sports domain. Her fascinating lecture entitled “[Mechanics of Sport](#)” engaged members of the public, K-12 students, undergraduates, graduate students, academics, and industry professionals alike, showcasing the role of mechanics on the understanding of classical concepts of running to resolving recent controversies

surrounding the home run rate in Major League Baseball. Peko graciously answered many questions after the event, inspiring the next generation of mechanicians.

*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, biomedicine, 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 are streamed live and archived for future use. We look forward to the third lecture in the series, on May 5, 2023, to be delivered by [Moriba K. Jah](#), a space environmentalist from the University of Texas at Austin. This past year we received a substantial donation from **Susan and David Hibbitt** to expand the impact of the Distinguished Lecture. We are extremely thankful for their generosity.*

USNC/TAM Webinars

In the past three years, the USNC/TAM delivered online events showcasing varying topics in mechanics “[Machine Learning in Mechanics](#)” and “[Art and Animation in Mechanics: Communicating Science and Engineering in the 21st Century.](#)”



If you are interested in organizing a Webinar, please contact the committee [chair](#).

USNC/TAM Young Observer Program



The 2022 Young Observers were Prof. **Hussein Aluie** of the University of Rochester and Prof. **Yash Kulkarni** of the University of Houston. Prof. Aluie is an expert in fluid dynamics, nonlinear multiscale science, and scientific computing. Prof. Kulkarni is an expert on computational mechanics and materials science. Both attended the 2022 USNC/TAM Annual Meeting. The previous Young Observers and Friends of the Committee have been active in USNC/TAM, with 2020 YO Sinan Keten participating in the Ad-Hoc Committee on the Structure of the USNCTAM



and 2021 YO Arezoo Ardekani presenting in the USNC/TAM's von Karman mini-symposium at the USNCTAM in Austin. Two early career researchers selected as Friends of the Committee for 2021, Prof. Sam Daly (UCSB) and Prof. Yong Zhu (NC State), have recently joined USNC/TAM.

The [USNC/TAM Young Observer Program](#) was launched in 2019-2020. The observers 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 the middle night of the meeting and the hotel accommodation for that night will be covered by the Committee.

The USNC/TAM invites member professional societies to nominate an early career professional to be one of the 2023-24 Young Observers. Society Representatives should send their nominations to Tom Pence, Secretary of the USNC/TAM, at pence@egr.msu.edu by January 31, 2023 (one nomination per society). A nomination package consists of the nominee's CV including the link to their webpage and a paragraph of nomination, explaining how the nominee has demonstrated leadership potential in mechanics and why the nominee would benefit from a term as a USNC/TAM Young Observer. The Committee anticipates selecting one Observer in Fluid Mechanics and one in Solid Mechanics each year. Nominees and nominators will be notified of the Committee's decision by February 28, 2023.

USNC/TAM Travel Fellowships Program

The USNC/TAM provided a variety of fellowships to students and early career scientists to attend the ICTAM and US National Congress on TAM in Austin, Texas. NSF awarded a small grant (#2135969) to the USNC/TAM to support U.S. early career scientists' attendance to ICTAM. The USNC/TAM provided **Thomas Hughes Fellowship** using private funds, to attend the USNCTAM. These fellowships are designed to encourage the participation of researchers from diverse backgrounds and institutions and those who might not have already been familiar with the U.S. or International Committees on Theoretical & Applied Mechanics. Congratulations to all fellowship recipients!

All fellows and other young researchers were invited to an online **Mentoring Event the Friday before the Congress**, led by **Prof. Wendy Crone** (U. Wisconsin), with 45 early career researchers attending. This event is part of a series designed to develop communications skills and professional development in early career researchers in mechanics. Participants learned about the role of USNC/TAM on the domestic and international mechanics stages, heard a presentation on “Getting the mentoring you need”, then participated in small group mentoring breakout sessions with senior members of the mechanics community in the U.S. We look forward to engaging this next generation of mechanicians in the activities of the USNC/TAM in the future!

A call for the next round of Travel Fellowships will be initiated in concert with the timeline of the 2024 ICTAM, to be held in Daegu (South Korea) (to be announced later in 2023).

Recent Trends in Mechanics Reports

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](#).

The USNC/TAM is pleased to invite proposals for the **Reports on Recent Trends in Mechanics** series. 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 chair of the Communications and New Directions subcommittee ([Yuri Bazilevs](#)) via email by **March 15, 2023**. Proposals will be reviewed by the subcommittee and confirmed by the full USNC/TAM in May 2023. Full reports will be due six months later (December 31, 2023) 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.

Highly Successful USNCTAM 2022



The US National Congress of Theoretical and Applied Mechanics is held every four years under the auspices of the U.S. National Committee on Theoretical and Applied Mechanics (USNC/TAM) to foster and promote the exchange of ideas and information among the various disciplines of the TAM community around the world, and to chart future priorities in mechanics related research, applications, and education. The 19th USNCTAM was successfully hosted by the University of Texas at Austin, at the AT&T Executive Education and Conference

Center from June 19-24, 2022. A special thanks to all organizers and the conference chair, Chad Landis, for delivering one of the best attended USNCTAM congresses (759 delegates, 300 students, 788 presentations from 952 abstracts, 186 Tech sessions in 63 mini-symposia, 55 posters, NSF office hours, and 100 Participants at a Women's Networking Event). Four fascinating **plenary lectures** were delivered covering climate change (**Jackie Chen**, *Sandia National Laboratories*), ocean exploration (**John Dabiri**, *California Institute of Technology*), data driven modeling in biomedical sciences (**Ellen Kuhl**, *Stanford University*), and additive and freeform manufacturing (**Nancy Sottos**, *University of Illinois at Urbana-Champaign*). A listing of the 31 mini-symposia in fluids and 32 mini-symposia in solids can be found at <https://www.usnctam2022.org/program>. Presentations were delivered in all areas of fluid and solid mechanics, including experimental mechanics, computational mechanics, dynamical systems, materials, data science, structural mechanics, and biomechanics.

During the conference, the USNC/TAM led a special mini-symposium on the legacy of Theodore von Karman in mechanics (solids and fluids) on the 100th anniversary of the Innsbruck meeting that led to IUTAM, spanning his impact on research, education and international collaboration. The mini-symposium highlighted his collected works and the role played by von Karman in addressing societal needs.

Report from the Special IUTAM General Assembly Meetings and Other IUTAM News



International Union of
Theoretical and Applied Mechanics

A two-day meeting of the IUTAM General Assembly was held on 22 and 23 August 2022 in Cambridge, UK. Besides discussing and voting matters pertaining to the business of IUTAM, the memory of Professor Alfred Kluwick was honored by the General Assembly with a moment of silence. Two major topics were discussed on the first day and voted on the second. The General Assembly unanimously adopted the following Resolution on the **registration of IUTAM as a new legal entity**: “*The General Assembly of the International Union of Theoretical and Applied Mechanics (IUTAM) agrees to the establishment of an incorporated association for IUTAM in Amsterdam, the Netherlands, in accordance with Dutch Civil Law. The new association will be a continuation of IUTAM under the same name. The General Assembly accepts the text of the Deed of Incorporation of the association that is attached to the Resolution. Internal regulations of the new association will be debated until they are acceptable to the General Assembly of the current IUTAM before they will be adopted by the general meeting of the first three members of the new association.*”

The second major agenda item concerned the **creation of a Diversity Advocacy Group**. The General Assembly adopted the following Resolution on Diversity: “IUTAM understands Diversity as the range of human differences, including but not limited to race, gender, age, subject of expertise and geographic. The GA wishes to establish a Diversity Advocacy Group (DAG) on diversity matters that is composed of members of the various IUTAM committees and reports to the Bureau, and thereby to the GA. The GA will vote at its ICTAM meetings on whether the DAG will continue or not for another 4 years, with a rotation of members on 1 November following each ICTAM. IUTAM will seek out diverse candidates for the membership of its committees (Bureau, Congress Committee, Symposia Panels) with the goal of achieving a composition that reflects Diversity. IUTAM Symposia and ICTAMs need to embrace Diversity in their choice of speakers and in all aspects of their activity. Early career researchers should be more involved in IUTAM organizational activity.” Horacio Espinosa was elected member of the Diversity Advocacy Group.

Other IUTAM news concerned IUTAM symposia and Summer Schools. The statistics of IUTAM Symposia and Summer Schools were strongly affected by the Covid-19 pandemic. Details concerning forthcoming Symposia in 2023 can be found in the [IUTAM website](#). 12 Symposia will be held in 2023.

Upcoming Dates, Deadlines and Calls

TBD	Application deadline for travel fellowships to ICTAM 2024
March 31, 2024	Individuals interested in proposing IUTAM symposia for the 2025/2026 period should contact Prof. Tom Pence, Secretary of the USNC/TAM , for assistance in developing such proposals.
August 25-30, 2024	The 26th International Congress on Theoretical and Applied Mechanics, ICTAM 2024, will be held in Daegu (South Korea)! Check out the promotional video on Youtube . Abstract deadline TBD.

USNC/TAM Member Societies and Officers

Executive Committee (2022-2024)

Chair	Horacio D. Espinosa (Northwestern)	Vice Chair	Melany Hunt (Caltech)
Secretary	Tom Pence (MSU)	Past Chair	Beverley McKeon (Stanford)
Soc. Coord.	Sonya Smith (Howard)		

Member societies and current representatives

AAM American Academy of Mechanics	[Open]
AIAA American Institute of Aeronautics & Astronautics	Paul Palies (U. Tennessee Space Institute)
AICHE American Institute of Chemical Engineers	Patrick Underhill (RPI)
AMS American Mathematical Society	Edriss Titi (Texas A&M)
APS American Physical Society	Beverley McKeon (Stanford)
ASA Acoustical Society of America	Christina Naify (NRL)
ASCE American Society of Civil Engineers	Glaucio Paulino (Princeton)
ASME American Society of Mechanical Engineers	Taher Saif (UIUC)
ASTM International	Richard Neu (Georgia Tech)
SEM Society for Experimental Mechanics	Yong Zhu (NCSSU)
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	Anne Grillet (Sandia)
USACM U.S. Assoc. for Computational Mechanics	Yuri Bazilevs (Brown University)
SNAME Soc. Naval Architecture and Marine Eng.	Adrian Onas (Webb Institute)
Members-at-Large	Tom Pence (Michigan State University)
	Anne Grillet (Sandia National Laboratory)
	Nicole Sharp (FYFD)
	Rick Neu (Georgia Tech)
	Sam Daly (UCSB)

Ex officio members

Ellen Arruda (University of Michigan)	Nadine Aubry (Tufts University)
L. Cate Brinson (Duke University)	Anne Karagozian (UCLA)
Theresa Kotanchek (Evolved Analytics LLC)	Chad Landis (University of Texas at Austin)
Gareth McKinley (MIT)	Robert McMeeking (UCSB)
Kathleen Stebe (University of Pennsylvania)	Roger Ghanem (UCLA)

National Academies Staff

Senior Program Officer: Ana Ferreras	BISO Director: TBD
Staff Support: James Manning	

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.