ASME VVUQ 2024

Verification, Validation, and Uncertainty Quantification Symposium

Program

https://event.asme.org/V-V

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SETTING THE STANDARD

Table of Contents

Dear VVUQ Symposium Attendee,

Welcome to the Symposium on Verification, Validation, and Uncertainty Quantification (VVUQ) at Texas A&M University! We are thrilled to have you join us for what promises to be an engaging and insightful exploration of a field that is increasingly crucial in the advancement of science and engineering. VVUQ represents the cornerstone of trustworthy computational predictions, ensuring that simulations are accurate, reliable, and adequately account for uncertainties. This year, we've observed a significant uptick in submissions related to the exciting domain of machine learning, highlighting the growing intersection between traditional computational methods and cutting-edge AI technologies. In fact, we've embraced AI ourselves to craft this welcome message, underscoring our commitment to innovation and the potential of artificial intelligence to enhance our understanding and methodologies. Thank you for your presence and participation. We look forward to the diverse perspectives and dynamic discussions that will unfold.

Joshua Kaizer
VVUQ 2024 Conference Chair

VVUQ Symposium Organizing Committee

Gregory Banway	Jeff Bischoff	Jeff Bodner	Kevin Dowding	Luis Eca
	Yassin Hassan		Marc Horner	

ASME VVUQ 2024

ASME VVUQ 2024
Verification, Validation, and Uncertainty
Quantification Symposium
May 15–17, 2024
Texas A&M Hotel and Conference Center
College Station, TX

Monday 5/13/2024	Tuesday 5/14/2024	Wednesday 5/15/2024	Thursday 5/16/2024	Friday 5/17/2024
*Committee Meetings 9:00 AM – 5:00 PM Memorial Student Center 275 Joe Routt Blvd See website for room assignments *Networking Reception 5:30 PM – 7:00 PM Block T Lounge, 3rd FL. Texas A&M Hotel and Conference Center	*Committee Meetings 9:00 AM – 5:00 PM Memorial Student Center 275 Joe Routt Blvd *See website for room assignments*	VVUQ 2024 Symposium Texas A&M Hotel and Conference Center *Registration in Lobby near Century Ballroom*	VVUQ 2024 Symposium Texas A&M Hotel and Conference Center *Registration in Lobby near Century Ballroom*	VVUQ 2024 Symposium Texas A&M Hotel and Conference Center
		Breakfast 8:00 AM– 8:45 AM Century III, First Fl.	**Breakfast** 8:00 AM– 8:45 AM Century III, First Fl.	**Breakfast** 8:00 AM– 8:45 AM Century III, First Fl.
		Welcome Keynote Speaker **Dr. Christopher J. Freitas Southwest Research Institute** 8:45 AM – 10:15 AM Century Ballroom IV Lobby Level	**Welcome** Keynote Speaker **David Aumiller Naval Nuclear Laboratory** 8:45 AM – 10:15 AM Century Ballroom IV Lobby Level	**Town Hall On VVUQ** 9:15 AM – 12:10 PM Century Ballroom IV Lobby Level ~~~~~~ Coffee Break 10:15 AM – 10:30 AM Century III, First Fl.
		Coffee Break 10:15 AM – 10:30 AM Century III, First Fl.	**Coffee Break** 10:15 AM – 10:30 AM Century III, First Fl.	**Close of Symposium Thank you for attending**
		Technical Sessions 10:30 AM – 12:35 PM Oak Room Laurel Room Leadership Lab Second Fl.	**Technical Sessions** 10:30 AM – 12:35 PM Oak Room Laurel Room Leadership Lab Second Fl.	
		Lunch 12:45 PM – 1:45 PM Century III, First Fl.	**Lunch** 12:45 PM – 1:45 PM Century III, First Fl.	
		Technical Sessions 1:45 PM – 3:00 PM Oak Room Laurel Room Leadership Lab Second Fl.	**Technical Sessions** 1:45 PM – 3:00 PM Oak Room Laurel Room Leadership Lab Second Fl.	
		Coffee Break 3:30 PM – 3:45 PM Century III, First Fl.	**Coffee Break** 3:30 PM – 3:45 PM Century III, First Fl.	
		Technical Sessions 3:45 PM – 5:25 PM Oak Room Laurel Room Leadership Lab Second Fl.	**Technical Sessions** 3:45 PM – 5:25 PM Oak Room Laurel Room Leadership Lab Second Fl.	
		Symposim Networking Reception 5:30 PM – 6:30 PM Pool Terrace, 3rd Fl.	**End of day two**	
		End of day one		

ACKNOWLEDGEMENT

The Verification, Validation, and Uncertainty Quantification Symposium is sponsored by ASME. All technical sessions and conference events will take place at Texas A&M Hotel & Conference Center. Please check the website schedule for event times and locations.

REGISTRATION FEES

Full Registration Fee includes:

· Admission to all technical sessions.

· All scheduled meals.

· Symposium program with abstracts.

- A One-day Registration includes admission to events above for the day only.

NAME BADGES

Name badges should be worn always during the conference. You will need it for admission to all conference functions unless otherwise noted. Your badge also provides a helpful introduction to other attendees.

COMPLIMENTARY ASME MEMBERSHIP

Non-ASME Members who pay the non-Member conference registration fee, including students who pay the non-Member student fee, will be offered a 4-month trial ASME Membership (complimentary) following the conference. Please allow approximately 4 weeks after the conclusion of the conference for your membership to become active. Visit www.asme.org/membership for more information about the benefits of ASME Membership.

INTERNET ACCESS IN THE HOTEL

Complimentary Wi-Fi is available in your sleeping room and in the meeting space at the Texas A&M Hotel & Conference Center.

EMERGENCY

In case of an emergency in the hotel, pick up any house phone which rings directly at the operator, and they can dispatch help.

ACCESSIBILITY AND GENERAL QUESTIONS

Whenever possible, we are pleased to accommodate attendees with special needs. Advance notice may be required for certain requests. For on-site assistance related directly to the conference events and for general conference questions, please visit the ASME registration desk located in the lobby near the Century Ballroom. For special needs related to your hotel stay, please visit the hotel front desk.

ONSITE REGISTRATION HOURS

Location: Century Ballroom Foyer

Tuesday, May 15	1:00 PM - 5:00 PM
Wednesday, May 16	8:00 AM - 5:00 PM
Thursday, May 17	8:00 AM - 5:00 PM

Breakfast, lunch and breaks will be in Century lll, First Fl.

Keynotes

Wednesday May 15, 2024, 9:15 AM

Dr. Christopher J. Freitas
Southwest Research Institute

Presentation Title: Verification, Validation and Uncertainty Quantification (VVUQ) – A Guide to Practical Implementation

Thursday, May 16, 2024, 9:15 AM

David Aumiller
Naval Nuclear Laboratory

Presentation Title: Verification, Validation, and Qualification in Engineering Decision Making

Townhall

Join us on Friday May 17, 2024 at 9:15am as we discuss a list of hot topics within the ASME VVUQ Community. Questions for this panel will be provided prior to the event

<u>MODERATORS:</u>

Dr. William Oberkampf has 54 years of experience in research and development in fluid dynamics, heat transfer, and solid mechanics. During the last 25 years he has focused on research, applications, and teaching of verification, validation, and uncertainty quantification of modeling and simulation. He is co-author of the book *Verification and Validation in Scientific Computing* published by Cambridge University Press. He is a Fellow of AIAA and a Fellow of NAFEMS.
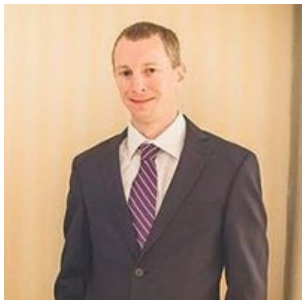
David Moorcroft is the Lead of the Biodynamic Research Team at the Federal Aviation Administration where he focuses on occupant protection and crashworthiness. He holds undergraduate and post-graduate degrees from the Engineering Science and Mechanics department at Virginia Tech. During his 20+ years with the FAA, he has emphasized the need for establishing rigorous approaches for determining computational model credibility. Since 2004, David has been involved with the creation of verification and validation standards. He is the chair of the ASME Verification, Validation, and Uncertainty Quantification (VVUQ) in Computational Modeling and Simulation standards committee, former chair of the VVUQ for Solid Mechanics committee, and a former Associate Editor for the ASME Journal of Verification, Validation, and Uncertainty Quantification.

WEDNESDAY, May 15, 2024

03-01 Verification Methods
5/15/2024
10:30 AM to 12:10 PM - Second Fl.
Chair: *Filipe Pereira - Los Alamos National Laboratory*
Chair: *Daniel Papert - ASME*
Chair: *Lydia Stanford - ASME*
Presentations:

Successive Procedure for Solution Verification Based on User Needs, {VVUQ2024-127747}
Technical Paper Publication
    Justin Weinmeister - Oak Ridge National Laboratory
    Devina P. Sanjaya - University of Tennessee, Knoxville

Code-Verification Techniques for Electromagnetic Surface Integral Equations, {VVUQ2024-121889}
Technical Presentation Only
    Brian Freno - Sandia National Laboratories
    Neil Matula - Sandia National Laboratories

Combining Numerical and Parameter Uncertainties Through Stochastic Solution Verification, {VVUQ2024-139363}
Technical Presentation Only
    Aaron Krueger - Sandia National Laboratories
    Casey Jelsema - Sandia National Labs

Estimation of Discretization Errors in Viscous Flow Simulations Based on the Rans Equations: Wall-Resolved Versus Wall-Functions, {VVUQ2024-132498}
Technical Presentation Only
    Luis Eca - IST
    Maarten Kerkvliet - MARIN
    Serge Toxopeus - MARIN

Solution Verification of CFD Simulations of a Drowning Body at Sea, {VVUQ2024-132630}
Technical Paper Publication
    S. Ribeiro e Silva - Instituto Superior Tecnico (IST)
    L. Eça - Instituto Superior Tecnico (IST)

04-01 Validation Methods
5/15/2024
10:30 AM to 12:10 PM - Second Fl.
Chair: *Daniel Papert - ASME*
Chair: *Lydia Stanford - ASME*
Chair: *Blake Lance - Sandia National Laboratories*
Chair: *Kevin Dowding - Sandia*
Presentations:

Enabling Quantitative Assessment of Validation Relevance to Model Predictions, {VVUQ2024-138477}
Technical Presentation Only
    Teresa Portone - Sandia National Laboratories
    Rileigh Bandy - Sandia National Laboratories
    Rebekah White - Sandia National Laboratories

Some Limitations of Model Validation by Hierarchy: Tin Ejecta Example, {VVUQ2024-131815}
Technical Presentation Only
> *Joanne Budzien - Los Alamos National Laboratory*

Application of Optical Digital Image Correlation for Validation of Hydrostatic Pressure Model of an Implantable Structure, {VVUQ2024-137439}
Technical Presentation Only
> *Elizabeth Gacek - Boston Scientific Corporation*
> *Devin Kalafut - Boston Scientific Corporation*
> *John Tangren - Boston Scientific Corporation*

Validation of a Surrogate Model for Marine Mammal Melon Tissue vs. Undex, {VVUQ2024-139227}
Technical Presentation Only
> *Emily Guzas - Naval Undersea Warfare Center, Division Newport*
> *Monica Deangelis - Naval Undersea Warfare Center, Division Newport*
> *Michael Galuska - Naval Undersea Warfare Center, Division Newport*
> *Eric Warner - Naval Undersea Warfare Center, Division Newport*
> *Lauren Marshall - Boston Children's Hospital*

Finite Element Model Validation of Cryogenic DOT-113 Tank Car Side Impact Tests, {VVUQ2024-132617}
Technical Paper Publication
> *Shaun Eshraghi - U.S. Department of Transportation*
> *Michael Carolan - U.S. Department of Transportation*
> *Benjamin Perlman - U.S. Department of Transportation*
> *Francisco González - U.S. Department of Transportation*

14-01 VVUQ and Decision Making
5/15/2024
10:30 AM to 12:10 PM - Second Fl.
Chair: *Daniel Papert - ASME*
Chair: *Lydia Stanford - ASME*
Chair: *Kevin Irick -*
Presentations:

> *Who Cares About Vvuq Analyses? {VVUQ2024-139274}*
> *Technical Presentation Only*
> > *Kevin Irick - Sandia National Laboratories*

> *Quantitative Approach for Model Credibility and Model Risk Assessment, {VVUQ2024-139394}*
> *Technical Presentation Only*
> > *Sankaran Mahadevan - Vanderbilt University*
> > *Pranav Karve - Vanderbilt University*
> > *Kyle Neal - Sandia National Laboratories*
> > *Joshua Mullins - Sandia National Laboratories*

> *A Demonstration of the Quantitative Approach for Model Credibility on an Electromagnetic Application, {VVUQ2024-139125}*
> *Technical Presentation Only*
> > *Kyle Neal - Sandia National Laboratories*
> > *Pranav Karve - Vanderbilt University*
> > *Sankaran Mahadevan - Vanderbilt University*
> > *Alden Pack - Sandia National Laboratories*
> > *Joshua Mullins - Sandia National Laboratories*

> *Toward Improved Credibility Assessment and Communication Concerning Risk and Consequence—transformation to Safety Factors on Estimated Uncertainty, {VVUQ2024-132123}*
> *Technical Presentation Only*
> > *Vicente Romero - Sandia National Laboratories*

Asymmetries in Test-Based and Simulation-Informed Decision Making, {VVUQ2024-139123}
Technical Presentation Only
    William Oberkampf - W L Oberkampf Consulting
    Jeffrey Bodner - Medtronic Corporation

02-01 Development and Application of Verification, Validation, Uncertainty Quantification Standards
5/15/2024
1:45 PM to 3:00 PM - Second Fl.
Chair: *Daniel Papert - ASME*
Chair: *Lydia Stanford - ASME*
Presentations:

    The Efforts of Asme Vvuq 60 in the Development of the Guideline of Verification Validation and Uncertainty Quantification of the Modeling of Energy Systems, {VVUQ2024-139403}
    Technical Presentation Only
        David (Weidong) Cheng - Fluor Corporation
        Deepak Datye - SIMULIA
        Donnie Alonzo - ASME

    A Cross-Society Collaboration Project, Mapping Consistency Confirmation Frameworks of Different Communities, {VVUQ2024-138662}
    Technical Presentation Only
        William Schindel - ICTT System Sciences
        Guodong Shao - National Institute of Standards and Technology
        Joseph Hightower - Retired
        Nigel Taylor - MBDA UK Ltd
        Laura Pullum - The POM Group, LLC
        John Matlik - Rolls-Royce Corporation
        Olivia Fischer - Georgia Institute of Technology
        Mat French - Northrop Grumman Corporation

    Developing a Universal Error Assessment Framework for Modeling and Simulation, {VVUQ2024-139260}
    Technical Presentation Only
        Joshua Kaizer - U.S. Nuclear Regulatory Commission
        Noushin Amini - U.S. Nuclear Regulatory Commission
        Adam Rau - U.S. Nuclear Regulatory Commission

    Vvuq 90 Credibility Assurance Framework for Aircraft Structures, {VVUQ2024-132931}
    Technical Presentation Only
        Torben Syberg - The Boeing Company

03-02 Verification Methods
5/15/2024
1:45 PM to 3:00 PM - Second Fl.
Chair: *Filipe Pereira - Los Alamos National Laboratory*
Chair: *Daniel Papert - ASME*
Chair: *Lydia Stanford - ASME*
Presentations:

    On the Performance of Solution Verification for Transient Flow Simulations, {VVUQ2024-131838}
    Technical Presentation Only
        Filipe Pereira - Los Alamos National Laboratory
        Jim Ferguson - Los Alamos National Laboratory

Code Verification for Shock Physics Using Practical Metrics, {VVUQ2024-138259}
Technical Presentation Only
    Brian Carnes - Sandia National Laboratories
    Maher Salloum - Sandia National Laboratories

Application of Self-Similarity to Numerical Convergence Analysis, {VVUQ2024-132036}
Technical Presentation Only
    Steven E. Anderson - Los Alamos National Laboratory
    Jim Ferguson - Los Alamos National Laboratory

Verification and Validation of the Boltzmann-Csd Solver Within the Sceptre Package., {VVUQ2024-138752}
Technical Presentation Only
    Harley Hanes - Sandia National Laboratories
    Shawn D. Pautz - Sandia National Laboratories
    Brian Freno - Sandia National Laboratories

05-01 Methods for Uncertainty Quantification, Sensitivity Analysis, and Prediction
5/15/2024
3:45 PM to 5:25 PM - Second Fl.

Chair: **Daniel Papert - ASME**
Chair: **Lydia Stanford - ASME**
Chair: **Geng Tian - FDA**
Chair: **Rama Gorla -**
Presentations:
    Propagation of Uncertainty in Model Inputs for Reactive Braze Run-Out Simulations, {VVUQ2024-131413}
    Technical Presentation Only
        Jeffrey Horner - Sandia National Laboratories
        Jaideep Ray - Sandia National Laboratories
        David Kemmenoe - Sandia National Laboratories
        Edward Arata - Sandia National Laboratories
        Ian Winter - Sandia National Laboratories
        Michael Chandross - Sandia National Laboratories
        Scott Roberts - Sandia National Laboratories
        Anne Grillet - Sandia National Laboratories

    Unraveling Sensitivity and Ensuring Reliability in Reynolds Stress Predictions for Data-Driven Rans, {VVUQ2024-139434}
    Technical Presentation Only
        William J. Rider - Sandia National Laboratories
        Matthew Barone - Sandia National Laboratories
        Eric Joshua Parish - Sandia National Laboratories
        Uma Balakrishnan - Sandia Nationnal Laboratories

    Interlaced Characterization and Calibration: Bayesian Optimal Experimental Design for Constitutive Model Calibration, {VVUQ2024-131302}
    Technical Presentation Only
        Denielle Ricciardi - Sandia National Laboratories
        Tom Seidl - Sandia National Laboratories
        Brian Lester - Sandia National Laboratories
        Amanda Jones - Sandia National Laboratories
        Elizabeth Jones - Sandia National Laboratories

11-01 Manufacturing and Advanced Manufacturing
5/15/2024
3:45 PM to 5:25 PM - Second Fl.

Chair: *Daniel Papert - ASME*
Chair: *Lydia Stanford - ASME*
Chair: *Geng Tian - FDA*
Chair: *Shengyen Li -*
Presentations:

> *A Statistical Approach to Identify the Variability of a Laser Powder Bed Fusion Additive Manufacturing Process,*
> *{VVUQ2024-130838}*
> *Technical Presentation Only*
>> *Shengyen Li - National Institute of Standards and Technology*
>> *Zhuo Yang - NIST*
>> *Jaehyuk Kim - NIST*
>> *Yan Lu - NIST*
>> *Paul Witherell - NIST*

> *Uncertainty Quantification Analysis of Yield Surface Models in Plasticity, {VVUQ2024-130914}*
> *Technical Presentation Only*
>> *Alexander Hanson - Sandia National Laboratories*
>> *William Scherzinger - Sandia National Laboratories*
>> *Brian Lester - Sandia National Laboratories*

> *Credibility Assessments of Calibrated Material Models for Woods., {VVUQ2024-131932}*
> *Technical Presentation Only*
>> *Kazumi Matsui - Yokohama National University*
>> *Chikako Natsumeda - Yokohama National University*
>> *Yuki Fukutani - Yokohama National University*
>> *Kazuyuki Kurata - Terumo Corporation*
>> *Takahiro Miura - ZUKEN Modelinx Inc.*
>> *Arata Tsuzuki - Dassault Systemes K.K.*
>> *Takeki Yamamoto - Hiroshima University*
>> *Hirofumi Sugiyama - University of Yamanashi*
>> *Dai Watanabe - Shibaura Institute of Technology*
>> *Takahiro Yamada - Yokohama National University*

> *Uncertainty Quantification of Drill Collar Fatigue Performance due to Manufacturing Tolerances, {VVUQ2024-132266}*
> *Technical Paper Publication*
>> *Pritha Ghosh - SLB*
>> *Michael H. Du - SLB*

THURSDAY, May 16, 2024

10-01 Medical Devices and Pharmaceuticals
5/16/2024
10:30 AM to 12:10 PM - Second Fl.

Chair: *Daniel Papert - ASME*
Chair: *Lydia Stanford - ASME*
Chair: *Marc Horner - ANSYS, Inc.*
Chair: *Pras Pathmanathan -*
Presentations:

> *Solution Verification Study for Finite Element Analysis of PLLA Stent Implantation, {VVUQ2024-132962}*
> *Technical Paper Publication*
>> *Ehsan Osloub - Veryst Engineering*
>> *Sean S. Teller - Veryst Engineering*

Credibility Assessment of in Silico Clinical Trials for Medical Devices, {VVUQ2024-130764}
Technical Presentation Only

Pras Pathmanathan - US Food and Drug Administration
Kenneth Aycock - US Food and Drug Administration
Andreu Badal - US Food and Drug Administration
Ramin Bighamian - US Food and Drug Administration
Jeff Bodner - Medtronic
Steven Niederer - Imperial College

Validation of an in Silico Leakage Model for Medical Device Applications, {VVUQ2024-139357}
Technical Presentation Only

Morgan C. Everly - BD
Shelby A. Bieritz - BD
Sebastian R. Winter - The College of New Jersey
Mitchell Evan Gatesman - BD
Christopher A. Basciano - BD
Marcus Rademacher - BD

Credibility Assessment of Radiofrequency Induced Heating Simulation for a Thoracolumbar Posterior Fixation Assembly, {VVUQ2024-137040}
Technical Presentation Only

Gurpreet Singh - NuVasive
Bhuvan Sai Lingam - NuVasive
Marc Horner - Ansys Inc
Chase Mcquarrie - NuVasive

13-01 Artificial Intelligence and Machine Learning Models
5/16/2024
10:30 AM to 12:10 PM - Second Fl.

Chair: **Daniel Papert - ASME**
Chair: **Lydia Stanford - ASME**
Chair: **Noah Van Dam - UMass Lowell**
Chair: **Gregory Banyay - APPLIED RESEARCH LABORATORY**
Presentations:

Credibility Assessment of Machine Learning-Based Surrogate Model Predictions on NACA 0012 Airfoil Flow, {VVUQ2024-132964}
Technical Paper Publication

Jared Kirsch - Texas A&M University
William Rider - Sandia National Laboratories
Nima Fathi - Texas A&M University

Initial Credibility Assessment of a Physics Informed Neural Network for Combustion Applications, {VVUQ2024-139373}
Technical Presentation Only

Ahmed Almeldein - University of Massachusetts Lowell
Noah Van Dam - University of Massachusetts Lowell

Interpretability of Machine Learning for Condition Monitoring of Nuclear Power Systems, {VVUQ2024-137767}
Technical Presentation Only

Tristan Villarreal - U.S. Nuclear Regulatory Commission
John Matrachisia - U.S. Nuclear Regulatory Commission
Raj Iyengar - U.S. Nuclear Regulatory Commission
Kevin Clarno - The University of Texas at Austin

Physics-Guided Bayesian Neural Networks and Their Application in ODE Problems, {VVUQ2024-122961}
Technical Paper Publication
> *Xinyue Xu - The Pennsylvania State University*
> *Suman Paneru - Pennsylvania State University*
> *Sez Atamturktur - Clemson University*
> *Julian Wang - Pennsylvania State University*

Trade Space Evaluation for Design Optimization of Quiet Structures, {VVUQ2024-132917}
Technical Presentation Only
> *Gregory Banyay - APPLIED RESEARCH LABORATORY*
> *Jasmine Walker - The Pennsylvania State University*
> *Tamy Guimaraes - The Pennsylvania State University*

15-01 Topics in VVUQ
5/16/2024
10:30 AM to 12:10 PM - Second Fl.
Chair: *Daniel Papert - ASME*
Chair: *Lydia Stanford - ASME*
Presentations:

Verification, Validation, and Calibration Through a Causal Lens, {VVUQ2024-132343}
Technical Paper Publication
> *Ron Gonzales - Idaho National Laboratory*
> *Diego Mandelli - Idaho National Laboratory*
> *Congjian Wang - Idaho National Laboratory*
> *Mohammad Abdo - Idaho National Laboratory*
> *Paolo Balestra - Idaho National Laboratory*
> *Sunming Qin - Idaho National Laboratory*
> *Zachary Welker - University of Michigan*
> *Victor Petrov - University of Michigan*
> *Annalisa Manera - University of Michigan*

Advances in Sparse-Sampling Approaches for Aleatory and Epistemic Uncertainties in Model Calibration and Inverse Problems, {VVUQ2024-131975}
Technical Presentation Only
> *Vicente Romero - Sandia National Laboratories*

A Novel, Consistency-Based Metric for Probabilistic Remaining Useful Life Model Selection, {VVUQ2024-139399}
Technical Presentation Only
> *Dongjin Du - Vanderbilt University*
> *Pranav Karve - Vanderbilt University*
> *Sankaran Mahadevan - Vanderbilt University*

Solving Functional Inverse Problems Using Alpert Multi-Wavelets, {VVUQ2024-139395}
Technical Presentation Only
> *Maher Salloum - Sandia National Laboratories*
> *Brad Bon - Sandia National Laboratories*

How to Trust the Simulation Results: A Tool-Supported Credibility Assessment Framework for Simulation-Informed Decision-Making, {VVUQ2024-134006}
Technical Presentation Only
> *Muhammed Atak - Robert Bosch*
> *Alexander Filimon - Robert Bosch*
> *Sebastian Fricke - Robert Bosch*
> *Thomas Goeppel - Robert Bosch*
> *Hans-Martin Heinkel - Robert Bosch*
> *Andreas Karl - Robert Bosch*
> *Johannes Von Keler - Robert Bosch*
> *Andreas Kerst - Robert Bosch*
> *Reto Koehler - Robert Bosch*

16-01 VVUQ and Digital Twins
5/16/2024
1:45 PM to 3:00 PM - Second Fl.

Chair: *Daniel Papert - ASME*
Chair: *Lydia Stanford - ASME*
Chair: *Marc Horner - ANSYS, Inc.*
Presentations:

Consensus Report on the Foundational Research Gaps and Future Directions for Digital Twins, {VVUQ2024-139382}
Technical Presentation Only
    Karen Willcox - University of Texas at Austin
    Carolina Cruz-Neira - University of Central Florida
    Xinyue Ye - Texas A&M University
    Brittany Segundo - National Academy of Sciences, Engineering, and Medicine
    Blake Reichmuth - National Academy of Sciences Engineering and Medicine

Development of Certified and Reliable Digital Twins in Nuclear Engineering: A Methodological Approach Based on Data-Driven Reduced Order Modelling, {VVUQ2024-139347}
Technical Presentation Only
    Rosa Difonzo - Politecnico di Torino
    Carolina Introini - Politecnico di Milano
    Elia Novarese - Politecnico di Torino
    Stefano Riva - Politecnico di Milano
    Laura Savoldi - Politecnico di Torino
    Antonio Cammi - Politecnico di Milano

Uncertainty Quantification in Digital Twins, {VVUQ2024-135240}
Technical Presentation Only
    Sheri Martinelli - Penn State University
    Justin Valenti - The Pennsylvania State University
    Chris Rogan - The Pennsylvania State University
    Michael Warren - The Pennsylvania State University

Uncertainty-Aware Digital Twin Framework for Maintenance Optimization of Offshore Wind Turbines, {VVUQ2024-137185}
Technical Presentation Only
    Xukai Zhang - Texas A&M University
    Jian Tao - Texas A&M University
    Arash Noshadravan - Texas A&M University

15-02 Topics in VVUQ
5/16/2024
1:45 PM to 3:00 PM - Second Fl.

Chair: *Daniel Papert - ASME*
Chair: *Lydia Stanford - ASME*
Presentations:

Vvuq and the Credibility of Simulations: The Tension Between "Good Enough" and Getting the "Right Answer for the Right Reason", {VVUQ2024-139174}
Technical Presentation Only
    Brandon Wilson - Los Alamos National Laboratory
    Aaron Koskelo - Los Alamos National Laboratory

Validation Error Extrapolation to Application Conditions in Hypersonic Aerodynamics, {VVUQ2024-139037}
Technical Presentation Only
> *Jared Kirsch - Sandia National Laboratories*
> *Blake Lance - Sandia National Laboratories*

Code-to-Code Benchmark of a Multi-Physics Multi-Phase Cfd Model for a Proton Exchange Membrane Fuel Cell, {VVUQ2024-139349}
Technical Presentation Only
> *Aldo Collaku - Politecnico di Torino*
> *Margherita Bulgarini - Politecnico di Milano*
> *Amedeo Grimaldi - Politecnico di Milano*
> *Andrea Baricci - Politecnico di Milano*
> *Augusto Della Torre - Politecnico di Milano*
> *Luca Marocco - Politecnico di Milano*
> *Riccardo Mereu - Politecnico di Milano*
> *Gianluca Montenegro - Politecnico di Milano*
> *Laura Savoldi - Politecnico di Torino*

Effect of Thermal Gap Width on Internal Temperatures of the TN-32 HBU Demo Cask, {VVUQ2024-131817}
Technical Paper Publication
> *Megan Higley - University of Nevada Reno*
> *Mustafa Hadj-Nacer - University of Nevada Reno*

06-01 Fluid Dynamics and Heat Transfer
5/16/2024
3:45 PM to 5:25 PM - Second Fl.

Chair: **Daniel Papert - ASME**

Chair: **Lydia Stanford - ASME**

Chair: **L. Eça - IST**

Presentations:
> *Modeling and Assessment for the Estimation of Heat Transfer Coefficients on Curved Downwards-Facing Heated Walls in Application to ERVC, {VVUQ2024-132689}*
> *Technical Paper Publication*
>> *Sameer Osman - Khalifa University*
>> *Imran Afgan - Khalifa University*
>> *Yacine Addad - Khalifa University*

> *Flow Visualization and Heat Transfer Uncertainty Quantification of Molten Salt Fluid Flow in a Natural Circulation Loop, {VVUQ2024-137452}*
> *Technical Presentation Only*
>> *Jadyn Reis - Texas A&M University*
>> *Thomas Carson - Texas A&M University*
>> *Joseph Seo - Texas A&M University*
>> *Yassin Hassan - Texas A&M University*

> *Statistic Evaluation of Conversion Method for Real Time Turbine Seal Clearance Assessment With Measurement Data, {VVUQ2024-139323}*
> *Technical Presentation Only*
>> *Taehong Kim - GE Aerospace*

> *Calibration and Uncertainty Quantification for Topographic Cfd Simulations Using Gaussian Processes, {VVUQ2024-139859}*
> *Technical Presentation Only*
>> *Adam Pintar - National Institute of Standards and Technology*
>> *Yunjae Hwang - National Institute of Standards and Technology*
>> *Donghun Yeo - National Institute of Standards and Technology*

Verification and Validation of Turbulence Modeling of Flow Through Triply Periodic Minimal Surfaces Porous Structures, {VVUQ2024-133017}
Technical Paper Publication
　　Cecilia Piatti - Politecnico di Torino
　　Alex Hicks - Texas A&M University
　　Eleonora Gajetti - Politecnico di Torino
　　Caleb Ward - Texas A&M University
　　Mahyar Pourghasemi - Western New England University
　　Luca Marocco - Politecnico di Milano
　　Laura Savoldi - Politecnico di Torino
　　Nima Fathi - Texas A&M University

05-02 Methods for Uncertainty Quantification, Sensitivity Analysis, and Prediction
5/16/2024
3:45 PM to 5:25 PM - Second Fl.

Chair: **Daniel Papert - ASME**
Chair: **Lydia Stanford - ASME**
Chair: **Geng Tian - FDA**
Chair: **Uma Balakrishnan -**
Presentations:
　　Probabilistic Study of Fluid / Solid Interaction in Arteries, {VVUQ2024-123481}
　　Technical Paper Publication
　　　　Rama Gorla - Air Force Institute of Technology

　　Uncertainties Quantification of the Experimental Measurements and the Numerical Model Used for the Evaluation of the Pressure Drops Along a Resonant Cavity Mock-Up Equipped With a New Mini-Channels Cooling Configuration, {VVUQ2024-139345}
　　Technical Presentation Only
　　　　Rosa Difonzo - Politecnico Di Torino
　　　　Antonio Cammi - Politecnico di Milano
　　　　Alberto Leggieri - Thales Avionics France
　　　　Andrea Lucchini - Politecnico di Milano
　　　　Luca Davide Marocco - Politecnico di Milano
　　　　Elia Novarese - Politecnico di Torino
　　　　Laura Savoldi - Politecnico di Torino
　　　　Sebastian Stanculovic - Karlsruher Institut für Technologie (KIT)

　　Uncertainty Quantification With Hyper-Reduced Order Model, {VVUQ2024-139222}
　　Technical Presentation Only
　　　　Suparno Bhattacharyya - Texas A&M University
　　　　Jian Tao - Texas A&M University
　　　　Eduardo Gildin - Texas A&M University
　　　　Jean Ragusa - Texas A&M University

　　Physical Regime Sensitivity: A Method for Global Sensitivity Analysis Based on Physical Variables Rather Than Model Parameters, {VVUQ2024-139172}
　　Technical Presentation Only
　　　　Joshua Dyer - Los Alamos National Laboratory
　　　　Michael Prime - Los Alamos National Laboratory

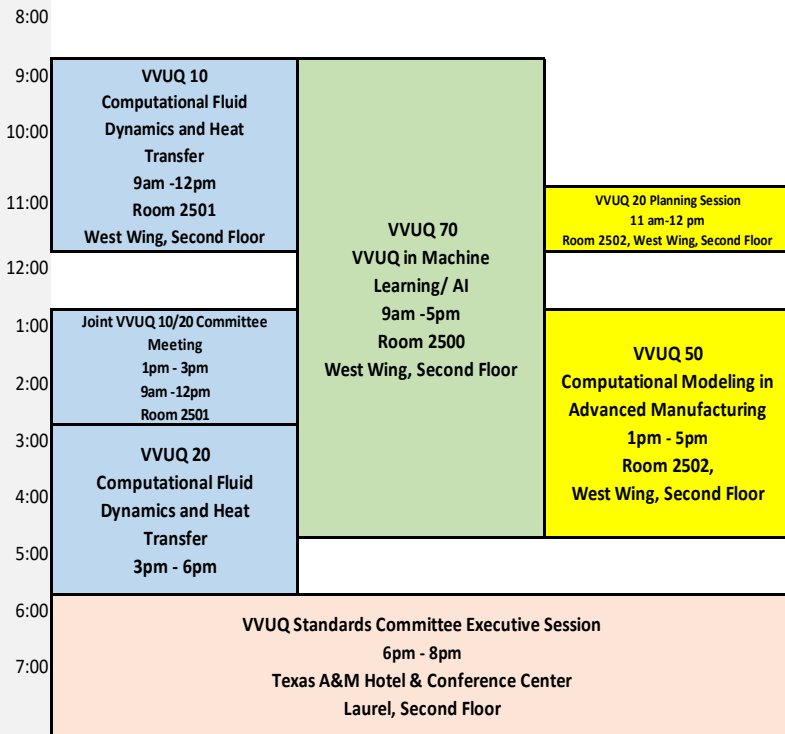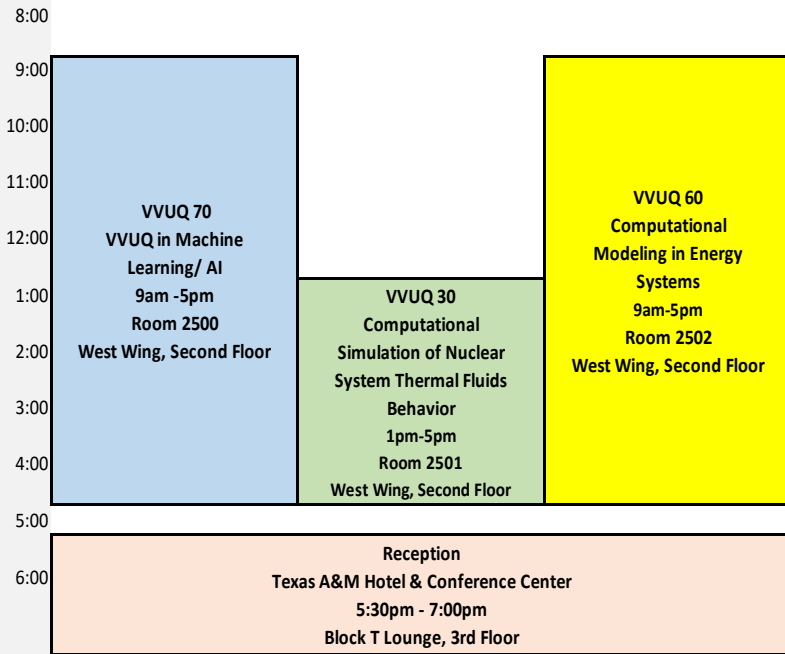Verification, Validation, and Uncertainty Quantification (VVUQ) in Computational Modeling and Simulation
Proposed In-Person Meeting Schedule - May 2024
Student Memorial Hall @ Texas A&M, College Station, TX
275 Joe Routt Blvd., College Station, TX
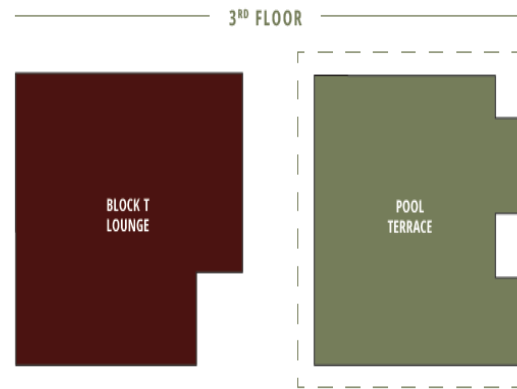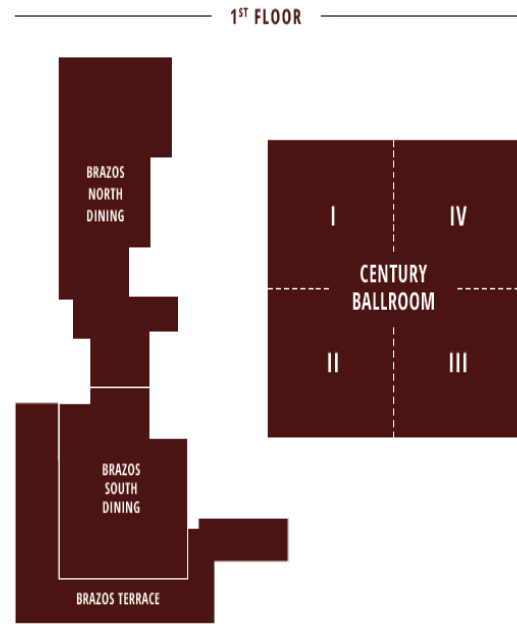
Times (CT)	Monday, May 13, 2024

VVUQ 70
VVUQ in Machine Learning/ AI
9am -5pm
Room 2500
West Wing, Second Floor

VVUQ 30
Computational Simulation of Nuclear System Thermal Fluids Behavior
1pm-5pm
Room 2501
West Wing, Second Floor

VVUQ 60
Computational Modeling in Energy Systems
9am-5pm
Room 2502
West Wing, Second Floor

Reception
Texas A&M Hotel & Conference Center
5:30pm - 7:00pm
Block T Lounge, 3rd Floor

VVUQ 10
Computational Fluid Dynamics and Heat Transfer
9am -12pm
Room 2501
West Wing, Second Floor

VVUQ 70
VVUQ in Machine Learning/ AI
9am -5pm
Room 2500
West Wing, Second Floor

VVUQ 20 Planning Session
11 am-12 pm
Room 2502, West Wing, Second Floor

Joint VVUQ 10/20 Committee Meeting
1pm - 3pm
9am -12pm
Room 2501

VVUQ 20
Computational Fluid Dynamics and Heat Transfer
3pm - 6pm

VVUQ 50
Computational Modeling in Advanced Manufacturing
1pm - 5pm
Room 2502,
West Wing, Second Floor

VVUQ Standards Committee Executive Session
6pm - 8pm
Texas A&M Hotel & Conference Center
Laurel, Second Floor

Texas A&M Hotel & Conference Center

MEETING AND EVENT SPACES

1ST FLOOR

BRAZOS NORTH DINING

CENTURY BALLROOM

I   IV

II   III

BRAZOS SOUTH DINING

BRAZOS TERRACE

2ND FLOOR

HULLABALOO | REVEILLE I II | OAK | LAUREL | SHIELD | STAR | SABER

NATION

TRADITIONS

CANNON | FLAG

STATE

EAGLE | LEADER-SHIP LAB

FREEDOM

ROSS II I | CORPS II I | HONOR BOARD ROOM | ANTE

3RD FLOOR

BLOCK T LOUNGE

POOL TERRACE

JOE ROUTT BLVD

▼ KYLE FIELD
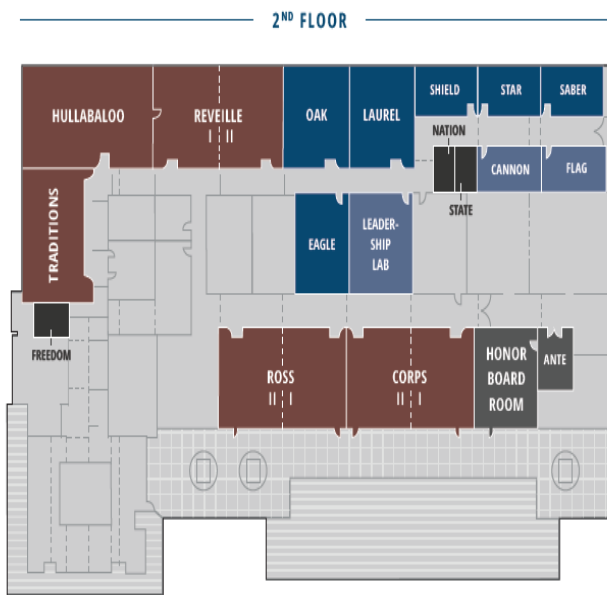
ASME VVUQ 2024

SAVE THE DATE

VVUQ Symposium 2025

APRIL 9-11, 2025

College Station, TX.

Venue TBD