Monday, May 13, 2019		
7:00 AM to 5:00 PM	**Registration**	Conference Registration Desk, 1st Floor
7:00 AM to 5:00 PM	Technical Training Course **MC133 - Verification and Validation in Scientific Computing**	Conference Rooms 2 & 3, 1st Floor
7:00 AM to 5:00 PM	Technical Training Course **MC146 – Probabilistic and Uncertainty Quantification Methods for Model Verification & Validation**	Conference Rooms 4,5,6, 1st Floor
9:00 AM to 5:00 PM	Committee Meeting **V&V 60 Subcommittee on Verification and Validation of Computational Modeling in Energy Systems**	Conference Rooms 9 & 10, 2nd Floor
1:00 PM to 6:00 PM	Committee Meeting **V&V 30 Subcommittee on Verification and Validation in Computational Simulation of Nuclear System Thermal Fluids Behaviour**	Conference Rooms 7 & 8, 2nd Floor
6:00 PM to 8:00 PM	Committee Meeting **V&V 50 Subcommittee on Verification and Validation of Computational Modeling for Advanced Manufacturing**	Conference Rooms 7 & 8, 2nd Floor
Tuesday, May 14, 2019		
7:00 AM to 5:00 PM	**Registration**	Conference Registration Desk, 1st Floor
7:00 AM to 5:00 PM	Technical Training Course **MC133 - Verification and Validation in Scientific Computing**	Conference Rooms 2 & 3 1st Floor
7:00 AM to 5:00 PM	Technical Training Course **MC146 – Probabilistic and Uncertainty Quantification Methods for Model Verification & Validation**	Conference Rooms 4,5,6 1st Floor
9:00 AM to 5:00 PM	Committee Meeting **V&V 10 Subcommittee on Verification and Validation in Computational Solid Mechanics**	Conference Rooms 7 & 8 2nd Floor
8:00 AM to 5:00 PM	Committee Meeting **V&V 20 Subcommittee on Verification and Validation in Computational Fluid Dynamics and Heat Transfer**	Conference Rooms 9 & 10 2nd Floor
8:00 AM to 4:00 PM	Committee Meeting **V&V 40 Subcommittee on Verification and Validation in Computational Modeling of Medical Devices**	Conference Rooms 11 & 12 2nd Floor
8:30 AM to 11:00 AM	Committee Meeting **V&V 40 End-to-End Example**	Conference Room 15 2nd Floor
1:30 PM to 4:00 PM	Committee Meeting **V&V 40 Patient Specific Models**	Conference Room 15 2nd Floor
8:00 AM to 5:00 PM	Committee Meeting **V&V 50 Subcommittee on Verification and Validation of Computational Modeling for Advanced Manufacturing**	Conference Rooms 13 & 14 2nd Floor
6:00 PM to 8:00 PM	Committee Meeting **V&V Standards Committee on Verification and Validation in Computational Modeling and Simulation Closed Session**	Conference Rooms 13 & 14 2nd Floor

Wednesday, May 15, 2019

7:00 AM to 5:00 PM	**Registration**	Conference Registration Desk, 1st Floor
7:00 AM to 8:00 AM	**Continental Breakfast**	Ballroom DE, 1st Floor
8:00 AM to 10:00 AM	**Plenary Sessions**	Ballroom F, 1st Floor

8:00 AM to 9:00 AM
Mark C. Anderson
Director, Office of Advanced Simulation and Computing and Institutional Research and Development Programs (NA-114), National Nuclear Security Administration

9:00 AM to 10:00 AM
Valri Lightner
Acting Director, Advanced Manufacturing Office, Office of Energy Efficiency and Renewable Energy, Department of Energy

10:00 AM to 10:25 AM	**Break**	Ballroom DE, 1st Floor

10:25 AM to 12:30 PM	**4-1 Verification Methods**	Conference Rms. 4, 5, 6, 1st Floor

Session Organizer: Luis Eca, *IST*

10:25 AM to 10:50 AM Technical Publication **VVS2019-5166** **Rigorous Code Verification: An Additional Tool to Use with the Method of Manufactured Solutions** Aaron Krueger, Vincent Mousseau, *Sandia National Laboratories* ; Yassin Hassan *Texas A&M University*	10:50 AM to 11:15 AM Oral Presentation **VVS2019-5184** **Iterated Error Transport Equations for Discretization Error Estimation** William Tyson, Chris Roy, *Virginia Tech*	11:15 AM to 11:40 AM Oral Presentation **VVS2019-5194** **Adaptive-Mesh Refinement Code-Verification Results from Radiative-Shock Solutions** Jim Ferguson, *Los Alamos National University*	11:40 AM to 12:05 PM Oral Presentation **VVS2019-5197** **Manufactured Solutions with Energy-only Source Terms** C. Nathan Woods, *Los Alamos National Laboratory*	12:05 PM to 12:30 PM Oral Presentation **VVS2019-5105** **Cross-Code Comparison, RE, MMS, and MES Towards Full Code and Calculation Verification of Numerical Flood Models** Tigstu Dullo, Alfred Kalyanapu, *Tennessee Tech University;* Kaveh Zamani, *Wood Rodgers, Inc.*

10:25 AM to 12:30 PM	**8-1 VVUQ for Solid Mechanics, Structures, Impact, and Blast**	Conference Rms. 7 & 8, 2nd Floor

Session Organizer: George Orient, *Sandia National Laboratories*

10:25 AM to 10:50 AM Oral Presentation **VVS2019-5216** **Application of V&V 40-2018 to a Hypothetical Aircraft Seat Certification Project** David Moorcroft, Joseph Pellettiere, *Federal Aviation Administration*	10:50 AM to 11:15 AM Oral Presentation **VVS2019-5170** **Calibration of Flyer-plate Impact Experiments using Particle-swarm Optimization Strategies** Jamil Gafur, Kyle Hickmann, *Los Alamos National Laboratory*	11:15 AM to 11:40 AM Technical Publication **VVS2019-5143** **Validation of a Surrogate Model for Marine Mammal Lung Dynamics under Underwater Explosive Impulse** Emily L. Guzas, Stephen E. Turner, Thomas N. Fetherston, Joseph Ambrico, *Naval Undersea Warfare Center, Division Newport* ; Matthew A. Babina, Brandon M. Casper, *Naval Submarine Medical Research Laboratory*	11:40 AM to 12:05 PM Oral Presentation **VVS2019-5167** **Verification and Validation of X-ray Induced Blowoff Modeling** Kin Lam, *Los Alamos National Laboratory*	12:05 PM to 12:30 PM Oral Presentation **VVS2019-5104** **Application of the Method of Manufactured Solution for Comprehensive Verification of a Coupled Flow-Deformation Solver in Geomechanics** Arman Khoshghalb, Omid Ghaffaripour, *UNSW Sydney* ; Kaveh Zamani, *Wood Rodgers, Inc.*

10:25 AM to 12:30 PM	**10-1 VVUQ for Biomedical Engineering**	Conference Rms. 9 & 10, 2nd Floor

Session Organizers: Marc Horner, *ANSYS, Inc;* Sudeep Sastry, *W. L. Gore & Associates, Inc.*

10:25 AM to 10:50 AM Oral Presentation **VVS2019-5216** **Construction, Calibration, Validation and Use of Gaussion Process Emulators in Medical Device Development** Brice Shireman, Darrin Beekman, Ismail Guler, Bryan Plunger, *Boston Scientific* ; Zachary Graves, *SmartUQ*	10:50 AM to 11:15 AM Technical Publication **VVS2019-5158** **Verification of Manual Digitization Methods during Experimental Simulation of Knee Motion** Zachary Hargett, Manuel Gutierrez, Melinda Harman, *Clemson University*	11:15 AM to 11:40 AM Oral Presentation **VVS2019-5169** **An End-to-End Example of the ASME V&V 40 Standard** Linda Knudsen, *Syncroness* , Sudeep Sastry, Brandon Lurie, *W. L. Gore & Associates, Inc* .; Marc Horner, *ANSYS, Inc* ., Dana Coombs, Michael Bushelow, *Depuy Synthes*	11:40 AM to 12:05 PM Oral Presentation **VVS2019-5221** **A Management Framework for Supporting Adaptive and Iterative VVUQ Efforts in Biomedical Modeling** Paulina Rodriguez, Seyed Ahmad Reza Dibaji, Pras Pathmanathan, Matthew Myers, Tina Morrison, *U.S. Food and Drug Administration* ; Bruce Murray, *Suny At Binghamton*	12:05 PM to 12:30 PM Oral Presentation **VVS2019-5220** **An Example of Implementing a Management Framework for Computational Modeling of an Electronic Drug Delivery System** Seyed Ahmad Reza Dibaji, Paulina Rodriguez, Pras Pathmanathan, Matthew Myers, Tina Morrison, *U.S. Food and Drug Administration* ; Bruce Murray, *Suny At Binghamton*

Wednesday, May 15, 2019		
12:30 PM to 1:30 PM	**Lunch**	Ballroom DE, 1st Floor

1:30 PM to 3:35 PM	**3-1 Topics in Verification, Validation & Uncertainty Quantification**				Conference Rms. 4, 5, 6, 1st Floor
Session Organizer: Kevin Dowding, *Sandia National Laboratories*					
1:30 PM to 1:55 PM Technical Publication **VVS2019-5112** **Bayesian Approach to Estimating Fireball Parameters from Remote Sensing Data** Derek Armstrong, *Los Alamos National Laboratory*	1:55 PM to 2:20 PM Oral Presentation **VVS2019-5119** **Challenges in Uncertainty Analysis for a Hybrid Probabilistic Model of Material Resistance to Crack Initiation** Leonid Gutkin, Douglas Scarth, *Kinectrics.*	2:20 PM to 2:45 PM Oral Presentation **VVS2019-5133** **Uncertainties in the Definition of Uncertainty Quantification** Joshua Kaizer, *U.S. Nuclear Regulatory Commission*	2:45 PM to 3:10 PM Technical Publication **VVS2019-5152** **Specific M&S Characteristics for Quantitative M&S Risk Assessment** John Madry, David Turner, David Hall, *SURVICE Engineering Company* ; James Elele, *NAVAIR 5.4*	3:10 PM to 3:35 PM Oral Presentation **VVS2019-5199** **V&V is Simply the Scientific Method for Computational Modeling and Simulation** William Rider, *Sandia National Laboratories*	

1:30 PM to 3:35 PM	**6-3 Methods for Uncertainty Quantification, Sensitivity Analysis, and Prediction**				Conference Rms. 7 & 8, 2nd Floor
Session Organizers: Gowri Srinivasan, *Los Alamos National Laboratories;* Joshua Mullins, *Sandia National Laboratories*					
1:30 PM to 1:55 PM Oral Presentation **VVS2019-5168** **Evaluating Sensitivity of Beryllium Flyer Plate Simulations to Strength Parameterization** Eva Tourangeau, Kyle Hickmann, *Los Alamos National Laboratory*	1:55 PM to 2:20 PM Oral Presentation **VVS2019-5172** **Confirmation of Discrete-Direct Calibration and Uncertainty Propagation for a Multi-Parameter Plasticity Model calibrated to Sparse Random Field Data** Vicente Romero, Justin Winokur, George Orient, James Dempsey, *Sandia National Laboratories*	2:20 PM to 2:45 PM Oral Presentation **VVS2019-5187** **Group-Based Latin Hypercube Sample Construction for Improved Convergence and Cross-Validation Estimates** Justin Winokur, *Sandia National Laboratories*	2:45 PM to 3:10 PM Oral Presentation **VVS2019-5193** **A causal perspective on data integration** Benjamin Schroeder, Lauren Hund, *Sandia National Laboratories*	3:10 PM to 3:35 PM Oral Presentation **VVS2019-5202** **Quantifying Simulation Uncertainty Using Physical Uncertainty Bounds** Rosalyn Rael, Diane E. Vaughan, Kendra Van Buren, Kyle Hickmann, Gowri Srinivasan, *Los Alamos National Laboratory*	

1:30 PM to 3:10 PM	**7-1 VVUQ for Fluid Dynamics and Heat Transfer**				Conference Rms. 9 & 10, 2nd Floor
Session Organizer: Donna Guillen, *Idaho National Laboratory*					
1:30 PM to 1:55 PM Oral Presentation **VVS2019-5140** **Characterization of Low Speed Wind Tunnel Flow Quality for CFD Validation Efforts** Paul Kristo, Saniya Sohail, Ryan Reed, Mark Kimber, *Texas A&M University*	1:55 PM to 2:20 PM Technical Publication **VVS2019-5114** **Modeling and Simulations of Deteriorated Turbulent Heat Transfer in Wall Heated Cylindrical Tube** Prasad Vegendla, Rui Hu, *Argonne National Laboratory*	2:20 PM to 2:45 PM Oral Presentation **VVS2019-5190** **Latin Hypercube Design of Experiments for Multiphase Flow Simulations of Foam Behavior in a Waste Glass Melter** Donna Guillen, Alexander Abboud, Idaho National Laboratory; Richard Pokorny, UCT Prague	2:45 PM to 3:10 PM Oral Presentation **VVS2019-5146** **Validation of a Virtual Towing Tank Tests** Vahid Hassani, Andrew Ross, Eloïse Croonenborghs, *SINTEF OCEAN*		

Wednesday, May 15, 2019

3:35 PM to 4:00 PM	**Break**	Ballroom DE, 1st Floor

4:00 PM to 5:40 PM	**4-2 Verification Methods**			Conference Rms. 4, 5, 6, 1st Floor
Session Organizer: Luis Eca, *IST*				
4:00 PM to 4:25 PM Oral Presentation **VVS2019-5136** **Code Verification through the Method of Rotated Solutions** Marc Horner, *ANSYS, Inc.*	4:25 PM to 4:50 PM Technical Publication **VVS2019-5137** **Analytic Solutions as a Tool for Verification And Validation of a Multiphysics Model** Ian Tregillis, Aaron C. Koskelo, *Los Alamos National Laboratory*	4:50 PM to 5:15 PM Oral Presentation **VVS2019-5159** **Functional Convergence of Multi-dimensional Numerical Solutions, Part 1: Theoretical Results** Francois Hemez, *Lawrence Livermore National Laboratory* ; William Rider *Sandia National Laboratories* ; Kendra Van Buren, *Los Alamos National Laboratory*	5:15 PM to 5:40 PM Oral Presentation **VVS2019-5160** **Functional Convergence of Multi-dimensional Numerical Solutions, Part 2: Application Examples** Kendra Van Buren, Jesse Canfield, *Los Alamos National Laboratory* ; Francois Hemez, *Lawrence Livermore National Laboratory* ; William Rider, *Sandia National Laboratories*	Session ends at 5:40

4:00 PM to 5:40 PM	**9-1 VVUQ for Nuclear Power Applications**			Conference Rms. 7 & 8, 2nd Floor
Session Organizers: Joshua Kaizer, *U.S. Nuclear Regulatory Commission* ; Yassin Hassan, *Texas A&M University*				
4:00 PM to 4:25 PM Oral Presentation **VVS2019-5132** **Credibility Assessment Framework for Data Driven Models** Joshua Kaizer, *U.S. Nuclear Regulatory Commission*	4:25 PM to 4:50 PM Technical Publication **VVS2019-5142** **Nuclear Dry Cask Storage Container CFD Model Experimental Validation and Uncertainty Quantification** Kimbal Hall, Alden Research Laboratory, Abdelghani Zigh, Jorge Solis, *US Nuclear Regulatory Commission*	4:50 PM to 5:15 PM Oral Presentation **VVS2019-5224** **The OSU High Temperature Test Facility—a Gas Reactor Integral Test Facility for Code Validation** Brian Woods, Izabela Gutowska, *Oregon State University,* Seth Cadell, *Nuclear Science and Engineering*	5:15 PM to 5:40 PM Oral Presentation **VVS2019-5225** **The International Experimental Thermal Hydraulic Systems Database (TIETHYS):Multiple Reactors** Upendra Rohatgi *Brookhaven National Laboratory* , Nicolas Soppera *OECD Nuclear Energy Agency*	Session ends at 5:40

4:00 PM to 5:40 PM	**14-1 VVUQ for Transportation Systems, Aerospace, and Automotive**			Conference Rms. 9 & 10, 2nd Floor
Session Organizer: David Moorcroft, *Federal Aviation Administration*				
4:00 PM to 4:25 PM Technical Publication **VVS2019-5155** **Verifying Spatiotemporal Systems via Robustness Bounds: An Application to Unmanned Underwater Vehicles** Tianchen Liu, Xingxue Zhao, Kevin Quigley, Shapour Azarm, Steven A. Gabriel, *University of Maryland, College Park* ; Daniel J. Lordan, *Lockheed Martin Advanced Technology Labs*	4:25 PM to 4:50 PM Oral Presentation VVS2019-5186 **Error Estimations for Stochastic Lagrangian-Eulerian Simulations of Sprays** Noah Van Dam, *University of Massachusetts Lowell* ; David Schmidt, *University of Massachusetts Amherst*	4:50 PM to 5:15 PM Oral Presentation VVS2019-5164 **Dynamic Load and Weld Fatigue Calculation for Validation of a Telescoping Boom Chassis** Cynde Murphy, *Adaptive Corp* ; Robert LeGrande, Kyle Roark, *Terex*	5:15 PM to 5:40 PM Oral Presentation **VVS2019-5148** **Uncertainty Quantification for noise prediction of the multi-rotor type UAV blade** DongWook Kim, Jeongwoo Ko, Soogab Lee, *Seoul National University*	Session ends at 5:40

6:00 PM to 7:00 PM	**V&V Standards Committee Open Session**	Ballroom F, 1st Floor

7:00 PM to 8:00 PM	**Reception**	Ballroom G, 1st Floor

Thursday, May 16, 2019

7:00 AM to 5:00 PM	**Registration**	Conference Registration Desk 1st Floor

7:00 AM to 8:00 AM	**Continental Breakfast**	Ballroom DE, 1st Floor

8:00 AM to 10:00 AM	**Plenary Sessions**	Ballroom F, 1st Floor

8:00 AM to 9:00 AM **Bill Skamarock** Senior Scientific Section Head of Mesoscale and Microscale Meteorology Laboratory Weather Modeling & Research at the National Center for Atmospheric Research/ University Corporation for Atmospheric Research	9:00 AM to 10:00 AM **Martin Pilch** Consulting Engineer, MPilchConsulting

10:00 AM to 10:25 AM	**Break**	Ballroom DE, 1st Floor

10:25 AM to 12:30 PM	**1-1 ASME V&V 40 Subcommittee Verification Working Group Challenge Problems for Computational Modeling of Medical Devices**	Conference Rms. 9 & 10, 2nd Floor

Session organizers: Marc Horner, *ANSYS, Inc* ; Ismail Guler, *Boston Scientific Corporation* ; Danny Levine, *Zimmer Biomet*

The working group is divided into two subgroups, which are currently organizing challenge problems covering code verification for computational fluid dynamics and calculation verification for computational solid mechanics.

Oral Presentation **VVS2019-5200** **V&V 40 Code Verification Challenge Problem** Marc Horner, *ANSYS, Inc.*	Oral Presentation **VVS2019-5201** **V&V 40 Calculation Verification Challenge Problems** Ismail Guler, *Boston Scientific*

10:25 AM to 12:30 PM	**6-2 Methods for Uncertainty Quantification, Sensitivity Analysis, and Prediction**	Conference Rms. 4, 5, 6, 1st Floor

Session Organizers: Gowri Srinivasan, *Los Alamos National Laboratory;* Benjamin Schroeder, *Sandia National Laboratories*

10:25 AM to 10:50 AM Oral Presentation **VVS2019-5141** **Verification, Validation, Uncertainty Quantification, and Calibration Hierarchy** Aaron Krueger, Vincent Mousseau, Troy Haskin, Nathan Porter, *Sandia National Laboratories* ; Yassin Hassan, *Texas A&M University*	10:50 AM to 11:15 AM Oral Presentation **VVS2019-5165** **Prediction Confidence Assessment based on Local Sensitivity** Kyle Neal, Sankaran Mahadevan, *Vanderbilt University* ; Abhinav Subramanian Vand, Joshua Mullins, Benjamin Schroeder, *Sandia National Laboratories*	11:15 AM to 11:40 AM Technical Publication **VVS2019-5149** **Sequential Bayesian History Matching for Model Calibration** Paul Gardner, Charles Lord, Robert J. Barthorpe, *University of Sheffield*	11:40 AM to 12:05 PM Oral Presentation **VVS2019-5162** **Probabilistic Risk Assessment: Strengths and Weaknesses** William Oberkampf, *W L Oberkampf Consulting*	12:05 PM to 12:30 PM Technical Publication **VVS2019-5150** **Prediction of Structural Reliability Through an Alternative Variability-Based Methodology** Kyle Haas, *Hinman Consulting Engineers*

10:25 AM to 12:05 PM	**7-2 VVUQ for Fluid Dynamics and Heat Transfer**	Conference Rms. 7 & 8, 2nd Floor

Session Organizers: Kevin Dowding, *Sandia National Laboratories*

10:25 AM to 10:50 AM Oral Presentation **VVS2019-5151** **The Use Of Domain Decomposition For UQ In Heat Transfer Applications: A Flexible Hierarchy of Approaches** John Tencer, Kevin Carlberg, *Sandia National Laboratories*	10:50 AM to 11:15 AM Technical Publication **VVS2019-5157** **A Numerical Study of Laminar and Intermittent Turbulent Flow Over Flat Plate Using Pseudo-Compressibility Model** Shivank Srivastava, Jonathan Robert Eastridge, Brandon Michael Taravella, Kazim Akyuzlu, *University Of New Orleans*	11:15 AM to 11:40 AM Oral Presentation **VVS2019-5175** **Validation of Computational Fluid Dynamics (CFD) Model of Smooth Seal by V&V 20-2009 Standard** Madeline Collins, Houston G. Wood, Cori E. Watson, *University of Virginia*	11:40 AM to 12:05 PM Oral Presentation **VVS2019-5191** **Atmospheric Flow Validation for Contaminant Transport** Blake W. Lance, Alexander L. Brown, Kevin Dowding, Michael D. Clemenson, *Sandia National Laboratories* ; Chris Elkins, *Stanford University* ; Michael Benson, *United States Military Academy*	

Thursday, May 16, 2019

12:30 PM to 1:30 PM	**Lunch**	Ballroom DE, 1st Floor

1:30 PM to 3:35 PM	**6-1 Methods for Uncertainty Quantification, Sensitivity Analysis, and Prediction**				Conference Rms. 4, 5, 6, 1st Floor
Session Organizers: Gowri Srinivasan, *Los Alamos National Laboratory;* Benjamin Schroeder, *Sandia National Laboratories*					
1:30 PM to 1:55 PM Technical Publication **VVS2019-5124** **Understanding the uncertainty in an equation of state model for a high explosive obtained from heterogeneous data** Stephen A. Andrews, Andrew M. Fraser, Scott Jackson, Eric Anderson, *Los Alamos National Laboratory*	1:55 PM to 2:20 PM Technical Publication **VVS2019-5125** **Numerical and Parameter Uncertainties: Are they independent?** Luis Eca, Rui Lopes *IST* ; Filipe Pereira, *Los Alamos National Laboratory* ; Guilherme Vaz, *MARIN*	2:20 PM to 2:45 PM Technical Publication **VVS2019-5127** **Bootstrapping and Jackknife Resampling to Improve Sparse-Data UQ Methods for Tail Probability Estimates with Limited Samples** Charles Jekel, Vicente Romero. *Sandia National Laboratories*	2:45 PM to 3:10 PM Oral Presentation **VVS2019-5135** **Uncertainty Quantification With Missing Data** Mark Andrews, Gavin Jones, *SmartUQ*	3:10 to 3:35 PM Oral Presentation **VVS2019-5139** **Statistical Qualification and Acceptance of Multivariate Bayesian Parameter Estimates** Timothy Hasselman *Timothy Hasselman Consulting* ; Thomas Paez, *Thomas Paez Consulting*

1:30 PM to 2:45 PM	**10-2 VVUQ for Biomedical Engineering**				Conference Rms. 7 & 8, 2nd Floor
Session Organizers: Tina Morrison, *Food and Drug Administration;* Sudeep Sastry, *W. L. Gore & Associates, Inc.*					
1:30 PM to 1:55 PM Oral Presentation **VVS2019-5209** **Investigation of identifiability properties of a fluid resuscitation model for hemorrhagic shock** Bahram Parvinian, Bahram Parvinian; Christopher Scully, Pras Pathmanathan, *U.S. Food and Drug Administration* ; George Kramer, *University of Texas Medical Branch* ; Jin Oh Hahn, *University of Maryland*	1:55 PM to 2:20 PM Oral Presentation **VVS2019-5178** **Anatomically Accurate Electrophysiology Simulations of the Human Heart** Federica Sacco, Constantine Butakoff, Jazmin Aguado-Sierra, *Barcelona Supercomputing Center* ; Mariano Vázquez, *Elem;* Tinen Iles, Paul Iaizzo, *University of Minnesota, Visible Heart Laboratory, Department of Surgery*	2:20 PM to 2:45 PM Technical Publication **VVS2019-5223** **Applicability Analysis of Validation Evidence for Biomedical Computational Models** Tina Morrison, Pras Pathmanathan, *U.S. Food and Drug Administration* ; Vicente Romero, *Sandia National Laboratories*		

1:30 PM to 3:35 PM	**12-1 VVUQ for Power Systems and Oil and Gas Applications**				Conference Rms. 9 & 10, 2nd Floor
Session Organizers: Pritha Ghosh, *Stress Engineering Services Inc* Nima Fathi, *Department of Mechanical Engineering University of New Mexico*					
1:30 PM to 1:55 PM Technical Publication **VVS2019-5113** **Data Analysis and Model Validation of Natural Gas Transmission Pipeline with Compressor Station** David Cheng, *Fluor Enterprises Inc.*	1:55 PM to 2:20 PM Oral Presentation **VVS2019-5121** **Verification and Validation of Finite Element Analysis Models for Acoustic Induced Vibration Analysis** Philip Diwakar, Yuqing Liu, Ismat El Jaouhari, *Bechtel* ; Dan Lin, *Bechtel Oil, Gas, and Chemical*	2:20 PM to 2:45 PM Oral Presentation **VVS2019-5213** **Validation of Finite Element Models for Various Types of Anomalies in Pipelines and Fittings** Pritha Ghosh, Mandar Kulkarni, *Stress Engineering Services Inc.*	2:45 PM to 3:10 PM Technical Publication **VVS2019-5134** **Computational Evaluation of Thermal Barrier Coatings: Two-Phase Thermal Transport Analysis** Kevin Irick, *The University of New Mexico / Applied Technology Associates* ; Nima Fathi, *University of New Mexico*	3:10 PM to 3:35 PM Oral Presentation **VVS2019-5156** **Conceptual Wellbore Modelling, Testing and Parameter Estimation Using Inverse Analysis** Magnus Jonsson, Lilja Magnusdottir, *University of Iceland*

Thursday, May 16, 2019

3:35 PM to 4:00 PM	**Break**	Ballroom DE, 1st Floor

4:00 PM to 5:40 PM	**1-3 ASME V&V 30 Subcommittee Benchmark Problem Series**	Conference Rms. 4,5&6 1st Floor
Session Organizers: Christopher J. Freitas, *Southwest Research Institute* ; Joshua Kaizer, *U.S. Nuclear Regulatory Commission;* Giacomo Busco, *Texas A&M University;* Michelle Pagano, *ASME*		

The V&V 30 Subcommittee currently supports a series of verification and validation (V&V) benchmark problems that demonstrate the need for developing standards related to high-fidelity CFD and systems analysis software for analyzing nuclear system thermal fluids behavior. The first V&V benchmark problem, Twin-Jet Computational Fluid Dynamics (CFD) Numerical Model Validation, which was initiated in 2016 and concluded in 2018, involved investigating the mixing between and the penetration of two parallel isothermal twin jets in the upper plenum of a High Temperature Gas-cooled Reactor (HTGR). The second V&V benchmark problem, Single Jet Computational Fluid Dynamics (CFD) Numerical Model Validation, which has been proposed for the 2019 V&V Symposium, involves simulating a single jet and plume in the upper plenum of a HTGR for single jet experiments at different Reynolds numbers. Each benchmark problem was designed to show the importance of proper scaling techniques for developing an experimental facility that provides the proper validation data for the full-scale prototype as well as the application of that validation data to similar but different conditions and prototypes. This session will present the overall vision and context of the V&V 30 Benchmark series, the outcome of the first V&V benchmark problem, and the plan for the second V&V benchmark problem.

Oral Presentation **VVS2019-5204** **ASME V&V 30 Subcommittee Benchmark Problem Series** Yassin Hassan, Richard Schultz, Texas A&M University; Christopher Freitas, *Southwest Research Institute* ; Joshua Kaizer, *U.S. Nuclear Regulatory Commission* , Michelle Pagano, *ASME*	Oral Presentation **VVS2019-5154** **Experimental Benchmark Data for an Isothermal Single Impinging Jet in the Upper Plenum of High Temperature Gas-Cooled Reactor** Giacomo Busco, Anas Alwafi, Thien Nguyen, Richard Schultz, Yassin Hassan, N.K. Anand, *Texas A&M University*

4:00 PM to 5:40PM	**4-3 Verification Methods**			Conference Rms. 7 & 8, 2nd Floor
Session Organizer: Luis Eca, *IST*				
4:00 PM to 4:25 PM Oral Presentation **VVS2019-5180** **Convergence Checks and Error Estimates for Finite Element Analysis of Contact Problems** Glenn Sinclair, *Louisiana State University* ; Jeff Beisheim, *Ansys Inc.*	4:25 PM to 4:50 PM Oral Presentation **VVS2019-5217** **Exploring Sublinear Convergence of the Blake Problem** Megan Harwell, C. Nathan Woods, *Los Alamos National Laboratory*	4:50 PM to 5:15 PM Oral Presentation **VVS2019-5188** **Convergence Characteristics of Errors for Large Eddy Simulation of Decay of Isotropic Turbulence in a Box** Tao Xing, *University of Idaho* ; Rabijit Dutta, *Virginia Commonwealth University*	5:15 PM to 5:40 PM Oral Presentation **VVS2019-5192** **Method of Nearby Problems for Contact Analysis of Solid** Takahiro Yamada, *Yokohama National University*	Session ends at 5:40 PM

4:00 PM to 5:40 PM	**13-1 VVUQ for Advanced Manufacturing and Machine Learning Models**			Conference Rms. 9 & 10, 2nd Floor
Session Organizer: Laura L. Pullum, *ORNL*				
4:00 PM to 4:25 PM Oral Presentation **VVS2019-5181** **Challenges to Verification and Validation of Data-driven Models used in Prognostic Health Management of Nuclear Power Plants** Gregory Banyay, *Westinghouse Electric Company*	4:25 PM to 4:50 PM Oral Presentation **VVS2019-5128** **Machine Learning Approaches for Finite Element Modeling Recommendations** Karanpreet Singh, Manasi Palwankar, Rakesh Kapania, *Kevin T. Crofton Department of Aerospace and Ocean Engineering, Virginia Tech* ; Daniel Hammerand, *M4 Engineering, Inc.*	4:50 PM to 5:15 PM Oral Presentation **VVS2019-5227** **Verification and Validation Interactions with the Model Development Stage for Advanced Manufacturing** *Laura L. Pullum, ORNL, Eric Sawyer, LLNL, William Schindel, ICTT System Sciences, Joe Hightower, The Boeing Company, Guodong Shao, NIST*	5:15 PM to 5:40 PM Oral Presentation **VVS2019-5226** **Applying Model-Based Patterns to Enhance Innovation Productivity Across the Model Life Cycle** William Schindel, *ICTT System Sciences*	Session ends at 5:40 PM

Friday, May 17, 2019

7:00 AM to 12:00 PM	**Registration**	Conference Registration Desk, 1st Floor

7:00 AM to 8:00 AM	**Continental Breakfast**	Ballroom DE, 1st Floor

8:00 AM to 10:05 AM	**1-2 Workshop on the Assessment of Multivariate Metric for Validation at Multiple Set Points**	Conference Rms. 4, 5, 6, 1st Floor

Session Organizer: Luis Eca, *IST*

The goal of the present Workshop is to assess the performance of the Multivariate Metric proposed in [1] to extend the point wise ASME V&V 20-2009 validation procedure [2] to error assessment at multiple set points. The quantities required to evaluate the metric are: set points that do not have to correspond to the same type of variable; the difference between the simulations and the experimental data , i.e. the comparison errors ; the covariance matrix Vval that depends on the input, experimental and numerical uncertainties and the knowledge if errors at the different set points are shared or not shared (independent). The selected test case is a statistically steady, two-dimensional flow of an incompressible fluid over a flat plate. Experimental data is available from the ERCOFTAC Classic Database including skin friction coefficient and mean velocity profiles at different locations of the plate. All Data can be accessed through this link: http://web.tecnico.ulisboa.pt/ist12278/Workshop_MultivariateMetric_2019/Workshop_MultivariateMetric_2019.htm

Authors:

Luis Eca *IST*	Filipe Pereira *Los Alamos National Laboratory*	Guilherme Vaz, *MARIN*	Martin Hoekstra, *MARIN*

8:00 AM to 10:05 AM	**5-1 Validation Methods**	Conference Rms. 7 & 8, 2nd Floor

Session Organizer: Aaron C. Koskelo, *Los Alamos National Laboratory*

8:00 AM to 8:25 AM Oral Presentation **VVS2019-5138** **Development of a statistically-based validation assessment framework to quantify model confidence, model acceptability, and validation recommendations** Brandon Wilson, Aaron C. Koskelo, *Los Alamos National Laboratory*	8:25 AM to 8:50 AM Oral Presentation **VVS2019-5179** **Comparison of Bayesian Calibration and an Area Metric Method for Validation of a Coronary Stent Model** Zachary Graves, Gavin Jones, *SmartUQ*	8:50 AM to 9:15 AM Oral Presentation **VVS2019-5183** **Model Prediction and Extrapolation in the Presence of Uncertainty** Nolan Whiting, Chris Roy, *Virginia Tech*	9:15 AM to 9:40 AM Oral Presentation **VVS2019-5189** **Spatial Error Field Reconstruction using Alpert MultiWavelets** Maher Salloum, Elizabeth Jones, David Hensinger, Kyle Karlson, *Sandia National Laboratories*	9:40 AM to 10:05 AM Oral Presentation **VVS2019-5222** **A Bayesian Framework for the Integration of Separate and Integral Effects Validation Data** Nathan Porter, *North Carolina State University* ; Vincent Mousseau, *Sandia National Laboratories*

10:05 AM to 10:30 AM	**Break**	Ballroom DE, 1st Floor

10:30 AM to 12:10 PM	**8-2 VVUQ for Solid Mechanics, Structures, Impact, and Blast**	Conference Rms. 7 & 8, 2nd Floor

Session Organizer: George Orient, *Sandia National Laboratories*

10:30 AM to 10:55 AM Oral Presentation **VVS2019-5182** **Validating Equations of State for Cerium Flyer Plates** Joanne Budzien, *Los Alamos National Laboratory*	10:55 AM to 11:20 AM Oral Presentation **VVS2019-5195** **Toward a Streamline-Based Fast Running Model for the Calibration of Late-Reacting Energetic Materials in Detonation** Michael Crochet, *Air Force Research Laboratory/University of Dayton Research Institute*	11:20 AM to 11:45 AM Oral Presentation **VVS2019-5198** **Code and Calculation Verification of Elasto-plastic Integration Algorithms in Geomechanics Constitutive Modeling** Yuan Feng, *UC Davis* ; Boris Jeremic*, University of CAL/LBNL* ; Kaveh Zamani, *Wood Rodgers, Inc.*	11:45 AM to 12:10 PM Oral Presentation **VVS2019-5176** **A Modular, Extensible, Version Controlled, Framework for Multi-Physics, Multi-Material Validation** Kyle Hickmann, *Los Alamos National Laboratory*	