Shanti Bhushan
Associate professor, Michael Hall School of Mechanical Engineering
Associate Director – CFD, Center for Advanced Vehicular Systems
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PROFESSIONAL PREPARATION

B. E., Civil Engineering, 1994-1998, Bengal Engineering College, Howrah, India.
M.Tech., Aerospace Engineering, 1998-2000, Indian Institute of Technology, Kharagpur, India.
Thesis: *Experimental and numerical prediction of the performance of Darrieus wind turbine.*
Ph.D.,
Dissertation: *Development of a nonlinear model for subgrid scale turbulence and its applications*.
Post-Doctoral Research Associate, May. 2003-Aug. 2005. Computational Simulation and Design Center (ERC), Mississippi State University.
Post-Doctoral Research Associate, Sep. 2005-Aug. 2006. Dept. of Civil and Environmental Engineering, Duke University.

APPOINTMENTS

2021 –	Associate Prof., Mechanical Engineering, Mississippi State Univ.
2016 –	Associate Director - CFD, Center for Advanced Vehicular Systems, Mississippi State Univ.
2024-	iDEELab Deputy Director, Thermo-Fluids and Energy Systems Area.
2023-	Associate Editor, ASME Journal of Fluids Engineering
2022-	Vice-Chair/Acting Chair, ASME CFD Technical Committee
2023 (Summer)	Summer Faculty Fellow Air Force Research Lab, Eglin Air Force Base
2015-2021	Assistant Prof., Mechanical Engineering, Mississippi State Univ.
2011-2015	Assistant Research Prof., CAVS, Mississippi State Univ.
2016 (Summer)	Summer Faculty Fellow Air Force Research Lab, Eglin Air Force Base
2015 (Summer)	Summer Faculty Fellow Air Force Research Lab, Eglin Air Force Base
2012 (Summer)	Visiting Summer Faculty, Mathematics and Computer Science Division, Argonne National Lab, Argonne, IL
2009-11	Associate Research Scientist, IIHR-Hydroscience and Engineering, Univ. of Iowa
2006-09	Assist. Research Scientist, IIHR-Hydroscience and Engineering, Univ. of Iowa

PUBLICATIONS

Journal Papers Published in Review

J1. Schemmel, Zope, Collins, Bhatia, **Bhushan**, Luke, Validation of a Coupled Fluid-Structure Solver for Investigation of Shock-Boundary Layer Interaction with Flexible Panels. submitted *AIAA Journal*.

J2. J. Bownan, S. Bhushan, G. Burgreen and Ian Dettwiller, Machine-Learned Actuator Line Model for Hydrokinetic Turbine Rotor, Submitted *Journal of Fluids Engineering*, 2024.

Journal Papers Published

J3. Schemmel A, Palakurthy S, Zope A, Collins E, Bhushan S. Development and Verification of Coupled Fluid–Structure Interaction Solver. Computation. 2024; 12(6):129.

J4. Oumnia El Fajri, Joshua Bowman, Shanti Bhushan, and Tim O'Doherty, Detached Eddy Simulation of Hydrokinetic Turbine Wake in Shallow Water Depths, *Ocean Engineering*, 306, 118083, 2024.

J5. Yugo Sanada, Zachary Starman, **Shanti Bhushan** and Frederick Stern. Four-Dimensional Particle Tracking Velocimetry Measurements of Unsteady Three-Dimensional Vortex Onset and Progression for 5415 Straight Ahead, Static Drift and Pure Sway. *Physics of Fluids*, 35(10), 2023.

J6. S. Palakurthy, A. Zope, Y. Yan, E. Collins, **S. Bhushan**. Numerical Study of the Effect of Micro Vortices on Chaotic Flutter. *Journal of Computational and Applied Mathematics*, 436 (11) 2024.

J7. **Shanti Bhushan**, Greg W. Burgreen, Wesley Brewer and Ian D. Dettwiller. Assessment of Neural Network Augmented Reynolds Averaged Navier Stokes Turbulence Model in Extrapolation Mode. *Physics of Fluids*, 25(5), 2023.

J8. S. **Bhushan**, M. Elmellouki, D. K. Walters, Y. A. Hassan, E. Merzari and A. Obabako, Analysis of Turbulent Flow and Thermal Structures in Low-Pr Buoyant Flows using Direct Numerical Simulations, *International Journal of Heat and Mass Transfer*, 189, 122733, 2022.

J9. Nanqiao Wang, **Shanti Bhushan**, Heejin Cho, Like Li, Modeling of Vapor-Liquid Interactions in Condensing Ejectors, *Applied Thermal Engineering*, 206, 118111, 2022.

J10. S. **Bhushan**, M. Elmellouki, T. Jamal, G. Busco, D. K. Walters, Y. A. Hassan, E. Merzari and A. Obabako, Assessment of Low- and High-Fidelity Turbulence Models for Heat Transfer Predictions in Low-*Pr* Flows, *Nuclear Engineering and Design*, 388, 111614, 2022.

J11. El Fajri, O., Bowman, J., **Bhushan S.**, Thompson, D. and O'Doherty, T. CFD Investigation of the Effect of Tip-Speed Ratio on Hydrokinetic turbine wake recovery. *Renewable Energy*, 182, 725-750, 2022.

J12. **Bhushan, S.**, Yoon, H. and Stern, F., Detached Eddy Simulations and Tomographic PIV Measurements of Flows over Surface Combatant 5415 at Straight-Ahead and Static Drift Conditions. *Ocean Engineering*, 238(15), 109658, 2021.

J13. John S. Haywood, Adrian Sescu, **Shanti Bhushan** and Chris Kees, Triple Hill's Vortex Synthetic Eddy Method, *Flow, Turbulence and Combustion*, 108, 627-659, 2022.

J14. Muthu, S., **Bhushan, S**. and Walters, DK. Identification of a Pressure-Strain Correlation Based Bypass Transition Onset Marker. *J. Fluids Eng*., 143(10), 101501, 2021.

J15. **Bhushan, S**.; Burgreen, G.W.; Brewer, W.; Dettwiller, I.D. Development and Validation of a Machine Learned Turbulence Model. *Energies* 2021, *14*, 1465. https://doi.org/10.3390/en14051465.

J16. **Bhushan S**, El Fajri OE, Hubbard G, Chambers B, Kees C. Assessment of Numerical Methods for Plunging Breaking Wave Predictions. *Journal of Marine Science and Engineering*. 2021; 9(3):264.

J17. Elmellouki, M., Busco, G., Jock, W. D., **Bhushan, S.**, Walters, D. K., Hassan, Y. A., Obabko, A., & Merzari, E. (2020). Validation of turbulence models for heat transfer prediction for low-pr flows. Transactions of the American Nuclear Society, 123(1), 1497-1500. https://doi.org/10.13182/T123-33179.

J18. S. Muthu and **S. Bhushan**, Temporal Direct Numerical Simulation for Flat-Plate Boundary Layer Bypass Transition, 21(5-6): 311-354, *Journal of Turbulence*, 2020. *(IF: 2.279)*

J19. El Fajri, O., **Bhushan, S.**, Thompson, D. S., O'Doherty, T. Numerical investigation of shallow-water effects on hydrokinetic turbine wake recovery. *Int. Marine Eng. Journal*, 3(1):25-35, 2020.

J20. Salunkhe, S., ElFajri, O., **Bhushan, S**., Thompson, D., O'Doherty, D., O'Doherty, T. and Mason-Jones, A., Validation of Hydrokinetic Turbulent Wake Predictions and Analysis of Wake Recovery Mechanism *Journal of Marine Science and Engineering*, 7, 362, 2019. *(IF:1.72)*

J21. **Bhushan S.** and S. Muthu, Parallel performance assessment of a pseudo-spectral solver for transition and turbulent boundary layer flows, *Engineering Applications of Computational Fluid Dynamics,* 13 (1): 763-781, 2019. *(IF: 1.918)*

J22. **Bhushan, S**., Yoon, H, Stern, F, Guilmineau, E., Visonneau, M., Toxopeus, S., Simonsen, C., Aram, S., Kim, S.-E. and Grigoropoulos, G., Assessment of CFD for Surface Combatant 5415 at Straight Ahead and Static Drift, *J. Fluids Eng,* 141(5), 2019. *(IF: 1.915)*

J23. **Bhushan, S**., Walters, DK., Muthu, S. and Pasiliao, CL. Identification of Turbulence Growth Markers for Boundary Layer Bypass Transition Using Direct Numerical Simulation, *J. Fluids Eng* 140(11), 11110, 2018. *(IF: 1.915)*

J24. Masih, E., **Bhushan S.** and Barros, A. "Direct Numerical Simulations to Investigate Energy Transfer between Meso- and Synoptic Scales." *Journal Atmospheric Sciences*, 75 (4), 1163-1171, 2018. *(IF: 3.578)*

J25. Mousaviraad, M., Conger, M., **Bhushan, S.,** Stern, F., Andrew Peterson, A. and Mehdi Ahmadian, M., Coupled Computational Fluid and Multi Body Dynamics Suspension Boat Modeling, *Journal of Vibration and Control*, 24(18), 2018. *(IF: 0.96)*

J26. Borse, M., **Bhushan, S**., Walters, DK. and Burgreen, GW. Numerical Simulations of Flow Pattern and Particle Trajectories in Feline Aorta for Hypertrophic Cardiomyopathy Heart Conditions. *Engineering Application for Computational Fluid Mechanics,* 12 (1), 57-73, *2018. (IF: 1.918)*

J27. **Bhushan, S.,** Mousaviraad, M. and Stern, F. Assessment of URANS Surface Effect Ship Models for Calm Walter and Waves. *Applied Ocean Research,* 67, 248-262, *2017. (IF: 2.161)*

J28. **Bhushan, S**., Yoon, H, Stern, F, Guilmineau, E., Visonneau, M., Toxopeus, S., Simonsen, C., Aram, S., Kim, S.-E. and Grigoropoulos, G., Verification and Validation of CFD for Surface Combatant 5415 for Straight Ahead and 20 Degree Static Drift Conditions, *SNAME transactions*, 2016. *(IF: 1.265)*

J29. **Bhushan**, S., Yoon, H. and Stern, F. "Large Grid Simulations Of Surface Combatant Flow At Straight-Ahead And Static Drift Conditions," *Int. J. Compt. Fluid Dynamics* 30(5): 356-362, 2016. *(IF: 0.961)*

J30. Robertson E., V. Chaudhary, **Bhushan S.** and DK Walters. Verification and Validation of OpenFOAM Numerical Methods and Turbulence Models for Incompressible Flows. *Computers and Fluids*, Vol. 123: 122-145, 2015. *(IF: 2.61)*

J31. Adedoyin, AA., Walters, DK. and **Bhushan**, S. Evaluation of turbulence model and numerical scheme combinations for practical Finite-volume Large Eddy Simulations, *Engineering Applications of Computational Fluid Mechanics*, Vol. 9, No. 1, 324–342, 2015. *(IF: 1.918)*

J32. Stern, M., Yang, J., Wang, Z., Hosseini H-S., Mousaviraad, M., **Bhushan S.**, et al. Recent progress in CFD for naval architecture and ocean engineering, *J. Hydrodynamics*, 27(1): 1-23, 2015. (*IF: 1.203*)

J33. Sadasivuni R., **Bhushan S.** and Cooke W.H., Convection–Diffusion Model for the Prediction of Anthropogenically-Initiated Wildfire Ignition, *International Journal of Disaster Risk Science*, 5(4): 274-295, 2014. (*IF: 1.458*)

J34. **Bhushan S.** and Walters D.K., Development of a Parallel Pseudo-Spectral Solver Using the Influence Matrix Method and Application to Boundary Layer Transition, *Engineering Applications of Computational Fluid Mechanics*, 8(1):158-177, 2014. *(IF: 1.918)*

J35. **Bhushan, S.** and Walters DK., "Dynamic Coefficient Evaluation for an Algebraic Subgrid Stress Model Using a Scale-Variant Approach," *International Journal of Numerical Methods in Fluids* 74 (3): 169-188, 2014. (*IF: 2.03*)

J36. **Bhushan**, **S**., Alam MF and Walters D.K., Evaluation of Hybrid RANS/LES Models for Prediction of Flow Around the DARPA SUBOFF Geometry, *Computers and Fluids* 88: 834-849, 2013. (*IF: 2.61*)

J37. Walters DK., **Bhushan S.**, F. Alam, and D. Thompson, Investigation of a Dynamic Hybrid RANS/LES Modeling Methodology for Finite-Volume CFD Simulations, *Flow, Turbulence and Combustion*, 91 (3): 643-667, 2013. (*IF: 2.207*)

J38. **Bhushan S.**, Walters DK., Burgreen, G., "Transitional and turbulent flow simulations in FDA's benchmark nozzle and capillary tube," *Cardiovascular Engineering and Technology*, 4(4): 408-426, 2013. (*IF: 1.451*)

J39. Stern, M., Yang, J., Wang, Z., Hosseini H-S., Mousaviraad, M., **Bhushan S.**, Xing, T. Computational Ship Hydrodynamics: Nowadays and Way Forward, *International Shipbuilding Progress*. 60(1-4): 3 – 105, 2013. (*IF: 0.86*)

J40. Sadasivuni R., Cooke W.H. and **Bhushan S.**, "Wildfire risk prediction in southeastern Mississippi using population interaction" *Ecological Modeling*, 251: 297-306, 2013. (*IF: 2.507*)
J41. Carrica P.M., Ismail F., Hyman H., **Bhushan S.** and Stern F., "Turn and Zigzag Maneuvers of a Surface Combatant Using a URANS Approach with Dynamic Overset Grids," *Journal of Marine Science and Technology*, 18 (2): 166-181, 2013. (*IF: 1.119*)
J42. Xing T., **Bhushan, S.**, and Stern F., "Unsteady Vortical Flow and Turbulent Structures for a Tanker Hull Form at Large Drift Angles, *Ocean Engineering*, 55: 23–43, 2012. (*IF: 2.214*)
J43. **Bhushan S**., Xing, T. and Stern, F. "Vortical structures and Instability analysis for Athena wetted transom flow with full-scale validation," *Journal of Fluids Engineering*, 134, 031201, 2012. *(IF: 1.915*)
J44. **Bhushan S.** and Walters DK. "A dynamic hybrid RANS/LES modeling framework," *Physics of Fluids*, 24, 015103, 2012. *(IF: 2.279)*
J45. **Bhushan S.,** Doctors, L. J., and Stern, F., "Verification and Validation of URANS wave resistance for Air Cushion Vehicles, including comparison with linear theory," *Journal of Ship Research*, 55(4), 2011. *(IF: 0.97)*
J46. **Bhushan S.,** Carrica, P., Yang, J. and Stern, F., "Scalability and Validation Study for Large Scale Surface Combatant Computations Using CFDShip-Iowa," *The International Journal of High Performance Computing Applications,* 25(4), 2011. (*IF: 2.015*)
J47. **Bhushan S.,** Xing, T., Carrica, PM. and Stern, F. "Model- and full-scale URANS simulations of Athena resistance, powering and seakeeping, and 5415 maneuvering," *Journal of Ship Research*, 53(4): 179-198, 2009. *(IF: 0.97)*
J48. **Bhushan S.** and Barros, AP. "A numerical study to investigate the relationship between moisture convergence patterns and the spatial distribution of orographic precipitation features," *J. Hydrometeorology*, 8(6): 1264-1284, 2007. *(IF: 3.79)*
J49. **Bhushan S.** "A proposed modification to the dynamic approach," *International Journal for Numerical Methods in Fluids* 54: 1075-1095, 2007. *(IF: 2.03)*
J50. **Bhushan S.** and Warsi, ZUA. "Large Eddy Simulation of free shear flow using algebraic model," *Computers and Fluids*, 36: 1384-1397, 2007. *(IF: 2.61)*
J51. **Bhushan S.** Warsi, ZUA. and Walters, DK., "Estimating backscatter in subgrid scale turbulence through algebraic modeling," *AIAA Journal,* 44(4): 837-847, 2006. *(IF: 1.638)*
J52. Walters DK. and **Bhushan S.** "A note on spectral energy transfer for multiscale eddy viscosity models in LES," *Physics of Fluids,* 17(11): 118102, 2005. *(IF: 2.279)*
J53. **Bhushan S.** and Warsi ZUA. "Large Eddy Simulation of turbulent channel flow using an algebraic model" *International Journal of Numerical Methods in Fluids* 49: 489-519, 2005. *(IF: 2.03)*

Journal Papers Published (Non-Rigorous Review)

J54. Satish Muthu and **Shanti Bhushan**, Analysis of Energy Transfer Mechanism in Bypass Transition Using Direct Numerical Simulation, *Journal of Mississippi Academy of Science*, 67(1), 2022: 44-55.
J55. Anup Zope, Seshendra Palakurthy, Eric Collins, and Shanti Bhushan, Aeroelastic Flutter Control using Micro-Vortex Generators, *Journal of Mississippi Academy of Science*, 67(1), 2022: 1-17.

Book Chapters

B1. Stern F., Hosseini H-S., Mousaviraad M., **Bhushan S.**, Evaluation of *Seakeeping*, Predictions. Chapter 4, pp. 141-202 in *Numerical Ship Hydrodynamics: An assessment of the Gothenburg 2010 Workshop*. Editors: Lars Larsson, Frederick Stern, Michel Visonneau, Springer, 2014. ISBN: 978-94-007-7188-8.
B2. **Bhushan S.**, T. Xing, M. Visonneau, J. Wackers, G. Deng, F. Stern and L. Larsson, Post Workshop Computations and Analysis for KVLCC2 and 5415. Chapter 7, pp. 265-318 in *Numerical Ship*

Hydrodynamics: An assessment of the Gothenburg 2010 Workshop. Editors: Lars Larsson, Frederick Stern, Michel Visonneau, Spinger, 2014. ISBN: 978-94-007-7188-8.

B3. Stern, F., **Bhushan**, S., Hosseini H-S., and Mousaviraad, M. "Analysis of G2010 Results for Seakeeping Test Cases 1.4a,b,c, 2.4, and 3.5," *Proceedings of Gothenburg 2010: A Workshop on CFD in Ship Hydrodynamics*, Dec. 8-10 2010, Gothenburg, Sweden.

Technical Reports

R1. NATO AVT 253: Assessment of Prediction Methods for Large Amplitude Dynamic Manoeuvres for Naval Vehicles. 2020. Acknowledged to be a co-author (from non-NATO country citizen) for "Chapter 3 – CFD validation for surface combatant 5415 at 10 drift angle."

R2. NATO AVT-183: Reliable Prediction of Separated Flow and Onset and Progression for Air and Sea Vehicles. 2015. Acknowledged to be the 1st author (from non-NATO country citizen) for "Chapter 4 –CFD validation for surface combatant 5415 at straight-ahead and 20 degree static drift conditions."

R3. NATO AVT-183: Reliable Prediction of Separated Flow and Onset and Progression for Air and Sea Vehicles. 2015. Acknowledged to be the 2nd author (from non-NATO country citizen) for "Chapter 3 – Tomographic PIV measurements for surface combatant 5415 at straight ahead and static drift conditions."

R4. **Bhushan**, S., Yoon, H., Stern, F., Guilmineau, E., Visonneau, M., Toxopeus, S., Simonsen, C., Aram, S., Kim, S.E. Grigoropoulos, G., and K. Petterson. "CFD Validation for Surface Combatant 5415 Straight Ahead and Static Drift 20 Degree Conditions." IIHR Report #493, 2015.

Media Publications

- Cover page Image for *Journal of the Mississippi Academy of Sciences*, Volume 67, Number 1 January, 2022 from the article: *Aeroelastic Flutter Control using Micro-Vortex Generators* by Anupe Zope, Seshendra Palakurthy, Eric Collins, Yonghua Yan, and Shanti Bhushan.
- Article: "HARNESSING THE POWER OF WIND AND WATER" in INSIGHTS & INNOVATION Computational Science at the Forefront of a Changing World, 2022.
- Article: *CFD Simulations Test Clean, Efficient, Innovative & Safer Nuclear Technologies*, CAVS Annual Report, 2021, pg. 23.
- Article: "High-Fidelity Loci-CHEM Simulations for Acoustic Wave Propagation and Vibration," Stimuli 2017-2018, pg. 64
- Article: "Direct numerical simulation of bypass transition over flat-plate boundary layer," for the Project High-Fidelity Loci-CHEM Simulations for Acoustic Wave Propagation and Vibration. Stimuli 2019-2020, pg. 82.
- Article: *Simulation based design of hydrokinetic farms*, CAVS Annual Report, 2015, pgs. 10-11.
- Article: *Researchers Work to Improve Solutions for One of Physics 'Last Unsolved Problems'* CAVS Annual Report, 2015, pg. 10.

Selected/Recent Conference Papers (Out of 90+)

C1. J. Bowman, S. Bhushan, G. Burgreen, and I. Dettwiller, A Machine-Learned Actuator Line Model for Hydrokinetic Turbines, Proceedings of the ASME 2024 Fluids Engineering Division Summer Meeting FEDSM2024 July 15-17, 2024, Anaheim, California FEDSM2024-131429.

C2. Mohamed En-Nali, Seshendra Palakurthy, Anup Zope2, Shanti Bhushan Eric. M. Collins, Edward Luke, Investigation of Low-High Fidelity Turbulent Models In Scramjet Engines, Proceedings of the ASME 2024 & Fluid Engineering Division Summer Meeting FEDSM 2024 July 15-17, 2024, Anaheim, CA, USA FEDSM2024-131336

C3. F. Stern, Y. Sanada, Z. Starman, S. Bhushan, C. Milano, 4DPTV Measurements and DES of the Turbulence Structure and Vortex Breakdown and Interaction for 5415 Sonar Dome Vortices, 35th Symposium on Naval Hydrodynamics Nantes, France, 8 – 12 July, 2024

C4. Melvy Fernandes, Greg Burgreen, Jessica Drewry, **Shanti Bhushan**, Computational Study of Transport Phenomena Within a Poultry Incubator, ASME 2023 International Mechanical Engineering Congress and Exposition, IMECE2023-114175, V009T10A011; 10 pages.

C5. Brewer et al. Entropy-driven Optimal Sub-sampling of Fluid Dynamics for Developing Machine-learned Surrogates, SC-W '23: Proceedings of the SC '23 Workshops of The International Conference on High Performance Computing, Network, Storage, and Analysis, November 2023, Pages 73 - 80

C6. Shanti Bhushan, Greg W. Burgreen, Anup Zope, and Parker Bailey, Hypersonic Trajectory Optimization for Minimum Heating using Machine Learned Physics Surrogates. AIAA Aviation 2024. Paper number: APA-42/FD-17, 4055163.

C7. Alta Knizley, Morgan Green, and **Shanti Bhushan**, Establishing Consistent Evaluation Metrics to Combat Pre-Requisite Deficits in Entry-Level Mechanical Engineering Courses, 2023 ASEE Southeastern Section Conference.

C8. A Chakir, EM Collins, A Zope, **S Bhushan**, Predicting the Functionality of a Scramjet Engine Using Quasi 1D Model, AIAA AVIATION 2023 Forum, 4139.

C9. Anup Zope, Eric M. Collins, Greg Burgreen, **Shanti Bhushan**, Edward Luke and Ian D. Dettwiller, Towards More Efficient Fluid-Thermal Interaction Analysis for Hypersonic Trajectory Flights. AIAA 2023-1039 Session: Fluid Structure Interactions III. https://doi.org/10.2514/6.2023-1039

C10. Christopher Pilmaier, **Shanti Bhushan**, and Mohammed Elmellouki. Validation of Large Eddy Simulation Turbulence Model on a Triple Jet Buoyant-Driven Flow. 2022 ANS Winter Meeting and Technology Expo. November 13–17, 2022, Phoenix, AZ.

C11. Yugo Sanada, Zachary Starman, **Shanti Bhushan** and Frederick Stern, Measurements of 3D Vortex Onset and Progression for 5415 Straight Ahead, Static Drift and Pure Sway. 34th Symposium on Naval Hydrodynamics Washington, DC, USA, 26 June - 1 July 2022.

C12. Mohammed El Mellouki, Shanti Bhushan, Chris Pilmaier, D. K. Walters, Michael Gorman, Brent Hollrah, Y. A. Hassan, Elia Merzari, Aleksandr Obabko, M. B. Dzodzo. Validation of Low and High-Fidelity Turbulence Models for Prediction of Turbulent Heat Transfer in Low Prandtl Number Flows Under Buoyant and Separated Flow Conditions. FEDSM2022-86863, V002T05A008, ASME 2022 Fluids Engineering Division Summer Meeting August 3–5, 2022 Toronto, Ontario, Canada.

C13. D. Keith Walters, **Shanti Bhushan**, Wayne Strasser, A Wall-Modeled Large Eddy Simulation Method for High-Order Spectral Element Solvers, FEDSM2022-87742, V002T05A026, ASME 2022 Fluids Engineering Division Summer Meeting August 3–5, 2022 Toronto, Ontario, Canada

C14. Seshendra Palakurthy, Anup Zope, Yonghua Yan, Eric M. Collins and **Shanti Bhushan**, Analysis of Passive Panel Flutter Control using Micro-Ramp, AIAA SCITECH 2022 Forum, AIAA 2022-0738

C15. J. Bowman, **S. Bhushan**, G. Burgreen, and I. Dettwiller, Hydrokinetic Turbine Performance And Wake Analysis Using A Data Driven Actuator Line Model, Proceedings of the International Mechanical Engineering Congress and Exposition IMECE2021, November 1-5, 2021.

C16. A Zope, A Schemmel, X Wang, **S Bhushan**, P Singh, E Luke, Assessment of Predictive Capability of Hybrid RANS/LES Turbulence Models for Thermofluid Applications, ASME 2021 Fluids Engineering Division Summer Meeting.

C17. A Zope, C Horner, EM Collins, **S Bhushan**, M Bhatia, Investigation of Flexible Panel Dynamic Response Induced by Coherent Turbulent Vortical Structures, AIAA Scitech 2021 Forum, 0251.

C18. M. Elmellouki, G. Busco, W.D. Jock, **S. Bhushan**, D.K. Walters, Y.A. Hassan, A. Obabko, and E. Merzari, *Validation of Turbulence Models for Heat Transfer Prediction for Low-Pr Flows*, Winter Meeting and Nuclear Technology Expo, 2020.

C19. **S. Bhushan**, Greg W. Burgreen, Joshua Bowman, Ian Dettwiller and Wes Brewer, Predictions of Steady and Unsteady Flows using Machine Learned Surrogate Models, Workshop on Artificial Intelligence and Machine Learning for Scientific Applications 2020.

C20. T. Jamal, **S. Bhushan** and DK. Walters, Numerical Simulation of Non-Stationary Turbulent Flows using Double Exponential Dynamic Time Filtering Technique, Proceedings of the ASME 2020 Fluids Engineering Division Summer Meeting FEDSM2020, July 12-16, 2020, Orlando, Florida, USA.

C21. **S. Bhushan**, Greg W. Burgreen, D. Martinez and Wes Brewer, Machine Learning for Turbulence Modeling and Predictions. Proceedings of the ASME 2020 Fluids Engineering Division Summer Meeting FEDSM2020, July 12-16, 2020, Orlando, Florida, USA.

C22. Schemmel, A., Zope, A., Collins, E., Bhatia, M. and **Bhushan, S**. Computational Study of Shock-Boundary Layer Interactions, Paper AIAA-2020-0938, AIAA SciTech Forum, Orlando FL, Jan 2020.

C23. Zope, A.D., Schemmel, A., Bhatia, M., **Bhushan, S.** and Collins, E. Development and Validation of Fluid-Thermal-Structural Interaction Solver for High Fidelity Transient Simulations, 2020 AIAA AVIATION Forum.

C24. **Bhushan, S.**, Burgreen, G., Collins, E., and Martinez-Gonzalez. Turbulence Modeling via Machine Learned Physics. HPCMP User Group Meeting, ERDC, Vicksburg, May 2019.

C25. Satish Muthu, **Shanti Bhushan** and D. Keith Walters. Evaluation of pressure strain correlation as a basis for development of a physics-based transition onset marker using temporal DNS of flat plate boundary layer. *Proceedings of the ASME-JSME-KSME 2019 Joint Fluids Engineering Conference AJKFLUIDS2019*, July 28-August 1, 2019, San Francisco, CA, USA.

C26. **Bhushan, S.**, M. Elmellouki., Jock, W.D., Walters, D.K., Lai, J.K., Hassan, Y.A., Obabko, A., & Merzari, E., 2019. Numerical Investigation of Flow and Heat Transfer Characteristics for Attached and Separated Low-Pr Flows. *Proceedings of the ASME-JSME-KSME 2019 Joint Fluids Engineering Conference AJKFLUIDS2019*, July 28-August 1, 2019, San Francisco, CA, USA.

C27. Bowman, J., **Bhushan, S.**, Thompson, D. S., Ellis, R., O'Doherty, T., Mason-Jones, A. Development of a Physics-Based Actuator Disk Model with Turbulence Induction for Horizontal Axis Tidal Turbines. *Proceedings of EWTEC 2019 – 13th European Wave and Tidal Energy Conference*.

C28. El Fajri, O., **Bhushan, S.**, Thompson, D. S., O'Doherty, T. Numerical investigation of shallow-water effects on hydrokinetic turbine wake recovery. *Proceedings of EWTEC 2019 – 13th European Wave and Tidal Energy Conference*.

C29. Robert Ellis, Joshua Bowman, Matthew Allmark, **Shanti Bhushan**, David Thompson, Allan, and Mason-Jones, Tim O'Doherty. Comparison of numerical software for predicting the performance of a horizontal axis tidal turbine. *Proceedings of EWTEC 2019 – 13th European Wave and Tidal Energy Conference*.

C30. O. El Fajri, **S. Bhushan**, D. Thompson, Numerical Predictions of Hydrokinetic Turbine Wake And Free-Surface Signatures, Early Career Technical Journal, Volume 17, 2018, pg. 43-51.

C31. **Bhushan, S.**, ElFajri, O., Jock, W.D., Walters, D.K., Lai, J.K., Hassan, Y.A., Jackson, R.B., Obabko, A., & Merzari, E., 2018. Assessment of RANS, LES, and Hybrid RANS/LES Models for the Prediction of Low-Pr Turbulent Flows. Proceedings of the ASME 2018 5th Joint US-European Fluids Engineering Summer Conference FEDSM2018, July 15-20, Montreal, Quebec, Canada.

C32. Joshua Bowman, **Shanti Bhushan**, David Thompson, Daphne O'Doherty, Tim O'Doherty, and Allen Mason-Jones. (2018). "A Physics-Based Actuator Disk Model for Hydrokinetic Turbines", 2018 Fluid Dynamics Conference, AIAA AVIATION Forum, (AIAA 2018-3227).

C33. John S. Haywood, Adrian Sescu, **Shanti Bhushan**, Justin Foster, and Mathew Farthing. (2018). "Towards a More Realistic Triple Hill's Vortex Synthetic Eddy Method for LES of Wall-Bounded Flows", 2018 AIAA Aerospace Sciences Meeting, AIAA SciTech Forum, (AIAA 2018-0837)

C34. Muthu, S., & **Bhushan, S**. (2017). Temporal Direct Numerical Simulations for Flat-Plate Boundary Layer. Early Career Technical Journal. Birmingham, AL. 16, 87-91.

C35. Bradley Chambers and **Shanti Bhushan**, Numerical Simulations Of Plunging And Surging Wave Breaking Using OpenFoam, Early Career Technical Journal, Volume 16, 2017, pg. 81-86.

C36. S. Muthu and **S. Bhushan**, Temporal Direct Numerical Simulations for flat-Plate Boundary Layer, Early Career Technical Journal, Volume 16, 2017, pg. 87-93.

C37. [1]Robinson, B., **Bhushan, S**. and Rush, S. Advanced Analytical Techniques: Exploring Aquatic Animal Ecology Through Isotopes And Biofluid Analysis, Mississippi Academy of Sciences, Eighty First Annual Meeting, February 23-24, 2017.

C38. **Bhushan, S.**, Salunkhe, S., & Thompson, D. Validation of Hydrokinetic Turbulent Wake Predictions and Analysis of Wake Recovery Mechanism. All Energy Conference. Glasgow, Scotland, UK, 2017.

C39. Burgreen, GW**, Bhushan, S.**, Wang, X., Chambers, B., Blake, J.**,** Thompson, D., & Foster, J. W. (2017). High-Fidelity Unsteady Flow Simulation Strategy for Ground Vehicle Fording and Swimming. *NATO CSO STO AVT-265 Specialist Meeting*. Vilnius, Lithuania.

C40. Salunkhe, S., **Bhushan, S**., Thompson, D. and O'Doherty, T. (2016). "Analysis and Validation of Hydrokinetic Turbine Turbulent Wake Predictions," *Asian Wave and Tidal Energy Conference (AWTEC) 2016*, Singapore, Oct 24-18, 2016.

C41. **Bhushan, S**, Borse, M., Walters, DK. and Pasiliao, C. Analysis of turbulence generation and energy transfer mechanism in boundary layer transition using direct numerical simulation. Proceedings of the ASME 2016 Fluids Engineering Division Summer Meeting, July 10-14, Washington, DC, USA, 2016.

C42. **Bhushan, S**., Borse, M., Robinson, B and Walters, DK. Turbulent Simulations of Particle Deposition in Feline Aorta Flow for Hypertrophic Cardiomyopathy Heart Conditions. AJK2015-04688, Proceedings of the ASME-JSME-KSME Joint Fluids Engineering Conference, Seoul, Korea, 2015.

C43. **Bhushan, S.**, Yoon, H. and Stern, F. Large grid simulations of surface combatant flow at straight-ahead and static drift conditions, 27th International Conference on Parallel Computational Fluid Dynamics, Parallel CFD2015, Montreal, CA.

C44. **Bhushan S.** and Pasiliao, CL. Turbulence Generation and Energy Transfer Mechanism in Boundary Layer Transition using Direct Numerical Simulation. AFRL Mathematical Modeling and Optimization Institute 3rd Annual Meeting, UF REEF, FL. July 27-31, 2015.

C45. **Bhushan, S.**, Yoon, H., Stern, F., Guilmineau, E., Visonneau, M., Toxopeus, S., Simonsen, C., Aram, S., Kim, S.E. Grigoropoulos, G., and K. Petterson. 2015. "Verification and Validation of CFD for Surface Combatant 5415 for Straight Ahead and 20 Degree Static Drift Conditions." 2015 World Maritime Technology Conference, Rhode Island, USA.

C46. Egeberg TF, Yoon H, Stern F, Pettersen B and **Bhushan S**. 3D measurements of vortex shedding from a ship hull by means of tomographic PIV. Proceedings of the ASME 2014 33rd International Conference on Ocean, Offshore & Arctic Engineering OMAE2014, June 8-13, 2014, San Francisco, USA.

C47. Yoon, H., Gui, L., **Bhushan, S.** and Stern, F. "Tomographic PIV Measurements For Surface Combatant 5415 Straight Ahead and Static Drift 10 and 20 Degree Conditions." 30th Symposium on Naval Hydrodynamics, Hobart, Tasmania, Australia, 2-7 November 2014

C48. **Bhushan S.**, Walters, DK., Merzari, E. and Obabko, A. Implementation and validation of a hybrid RANS/LES model in the spectral element solver nek5000. Proceedings of the ASME 2014 4th Joint US-European Fluids Engineering Division Summer Meeting FEDSM2014, August 3-7, 2014, Chicago, Illinois, USA.

C49. Robertson E., Chitta, V, Walters DK and **Bhushan S.** On the vortex breakdown phenomenon in high angle of attack flows over delta wing geometries. Proceedings of the ASME 2014 International Mechanical Engineering Congress & Exposition, IMECE2014 November 14-20, 2014, Montreal, Quebec, Canada.

C50. M. Borse, **S. Bhushan** and DK. Walters. Laminar/transition/turbulent flow simulations of aortic thromboembolism in feline Hypertrophic cardiomyopathy. 10th Mississippi State Conference on Differential Equations and Computational Simulations, October 23-25, 2014, Starkville, MS, USA.

[1] Undergraduate students at MSU are marked in BLUE.

C51. Robertson E., Chitta, V, **Bhushan S.** and Walters DK. Turbulent and vortical structure analysis of the vortex breakdown phenomenon over delta. 10th Mississippi State Conference on Differential Equations and Computational Simulations, October 23-25, 2014, Starkville, MS, USA.
C52. **Bhushan S.** and McLaurin D., Uncertainty Quantification of Hybrid RANS/LES Simulations Using Turbulence-Length-Scale-Based Adaptive Mesh Refinement. 12th U.S. National Congress for Computational Mechanics, USNCCM12-373, 2013.
C53. Robertson E., **Bhushan S.**, and Walters D.K., Two- and Three-Dimensional Laminar and Turbulent Flow Simulations Using OpenFOAM, 2013 Region II AIAA Student Conference, 2013.
C54. **Bhushan S.,** Walters DK., Barros A and Nogueira M. "Spectral Gap Energy Transfer in Atmospheric Boundary Layer," AGU, San Francisco, 3-7 Dec. 2012.
C55. Mousaviraad S.M., **Bhushan S.** and Stern F., "CFD Prediction of Free-Running SES/ACV Deep and Shallow Water Maneuvering and Course-Keeping in Calm Water and Waves." Abstract submitted: MARSIM, Singapore Polytechnic, Singapore, 23-27 April 2012.
C56. **Bhushan S.**, Stern, F. and Doctors, L.J., "T-Craft Calm Water Resistance and Motions, and Seakeeping in Regular Waves," 11th International Conference on Fast Sea Transportation, September 26-29, Hawaii, 2011.
C57. **Bhushan S**., Hanaoka A., Yang, J. and Stern, F., Wall-Layer Modeling for Cartesian Grid Solver Using an Overset Boundary Layer Orthogonal Curvilinear Grid, *49th AIAA Aerospace Sciences Meeting*, 2011.
C58. Drazen, Fulletron, Fu, Beale, O'Shea, Bruker, Dommermuth, Wyatt, **Bhushan**, Carrica and Stern, "A comparison of model-scale experimental measurements and computational predictions for a large transom-stern wave," *28th Symposium on Naval Hydrodynamics*, Pasadena, California, 12-17 September 2010.
C59. Yang, J., **Bhushan**, **S.** et al., "Large eddy simulation of ship flows with wall-layer models on Cartesian grids," *27th Proceedings of the Symposium of Naval Hydrodynamics, Seoul, Korea*, 2008.
C60. Wyatt, Fu, Taylor, Terrill, Xing, **Bhushan**, O'Shea and Dommermuth "A comparison of full-scale experimental measurements and computational predictions of the transom-stern wave of the R/V Athena I," *27th Proceedings of the Symposium of Naval Hydrodynamics, Seoul, Korea*, 2008.
C61. Adedoyin AA., Walters DK. and **Bhushan S.** "Assessment of modeling and discretization error in finite-volume large eddy simulations," *ASME International Mechanical Engineering Congress and Exposition,* IMECE2006-14918, 2006.
C62. Prabhu R., Brewer W., Thompson D.S. and **Bhushan S.**, "Computational Study of Vortex-Vortex Interactions," *The Sixth Mississippi State - UAB Conference on Differential Equations & Computational Simulations*, 2005.
C63. Walters DK. and **Bhushan S.** "Specification of Time-Dependent Inlet Boundary Conditions for LES, VLES, and DES of Turbulent Flow," *43rd AIAA Aerospace Sciences Meeting and Exhibit,* 2005.

INTELLECTUAL PROPERTY

- Developed a **hybrid OpenMP/MPI parallel pseudo-spectral code**, employing FFT in the homogeneous directions and Chebyshev polynomial in the wall normal direction. The solver is scalable up to 16K processors for simulating canonical flows such as, temporally developing turbulent planar jet, mixing layer and channel flows. The solver is being used for turbulence model development, including DNS studies. Development plan includes implementation of active/passive scalar transport equations, two-phase capability and implementation of curvilinear grids to allow periodic surface undulations.

- **ParSpectra Teaching Module:** Developed a Graphics User Interface for the pseudo-spectral code to be used as Lab Module in CFD, Viscous and Turbulent flow courses. The teaching module allows RANS/LES/DNS of wall-bounded channel flow and free-shear jet and mixing layer turbulent flows.

COURSES TAUGHT

- Viscous II ME 8823, Dept. Mechanical Eng., Mississippi State University.
- Viscous I ME 8813, Dept. Mechanical Eng., Mississippi State University.
- Intermediate Fluid Dynamics ME 4833/6833, Dept. Mechanical Eng., Mississippi State University.
- Thermodynamics I ME 3513, Dept. Mechanical Eng., Mississippi State University.
- Fluid Mechanics EM3313(02), Dept. Aerospace Eng., Mississippi State University
- CFD Lab instructor for Mechanics of Fluids and Transport Processes (57:020) at University of Iowa, Fall 2008 and 2009.

STUDENT ADVISING

Current Student

PhD (Role – Advisor)

- Christopher Pilmaier, Mechanical Engineering. Expected graduation, Spring 2024.
- Mohammed Elmellouki, Mechanical Engineering. Expected graduation Fall 2022.
- Seshendra Palakurthy, Computational Engineering. Graduation TBD.
- Joshua Bowman, Aerospace Engineering (Dissertation director), Summer 2022.

MS

- Parker, Bailey, Aerospace Engineering. Graduation TBD.
- En-Nali Mohammed, Mechanical Engineering. Spring 2023.

Past Students

PhD Student

- Walid Arselene, Computational Engineering. Graduation Spring 2022.
- Davood Darmichilli, Computational Engineering. Graduation Fall 2022.
- Oumnia ElFajri, Mechanical Engineering. Expected graduation, Fall 2022
- Satish Muthu, Mechanical Engineering. Graduated, Summer, 2020.
- Ravi Sadasivuni (PhD), Dept. GeoScience, Mississippi State University, Fall 2013.

MS Students (Primary Role – Advisor)

- Aasma Chakir, Mechanical Engineering. Fall 2022.
- Christian Spenser-Coker, Computational Engineering, Spring 2022
- Avery Schemmel, Mechanical Engineering. Summer 2020.
- A. Ittycheri, Mechanical Engineering, Fall 2020.
- Graham Hubbard, Mechanical Engineering, Spring 2020.
- Bradley Chambers, Mechanical Engineering, Fall 2017.
- Sanchit Salunkhe, Mechanical Engineering, Fall 2016.
- Manish Borse, Mechanical Engineering, Spring 2016.

MS Students (Primary Role – Dissertation Director)

- Visrant Choudhury (MS), Aerospace Engineering, Mississippi State, Spring 2013.
- Eric Robertson (MS), Mechanical Engineering, Mississippi State, Spring 2015.

Undergraduate Students

- Paromita Mitra, Aerospace Engineering, Mississippi State University, Fall 2011 – Spring 2012.

- Eric Robertson, Aerospace Engineering. Mississippi State University, Fall 2012 – Fall 2013.
- Manish Borse, Mechanical Engineering, Mississippi State University, Fall 2011 – Spring 2014.
- Pranav Deshpande, Mechanical Engineering, Mississippi State University, Fall 2013 – Fall 2014.
- Bryan Robinson, Aerospace Engineering. Mississippi State University, Spring 2014- Fall 2017.
- Gaurav Nag, Mechanical Engineering, Mississippi State University, Spring 2017- Spring 2019.
- Jonathan Roark, Aerospace Engineering, Spring 2018- Spring 2019.

AWARDS AND AFFILIATIONS

- Outstanding Senior Faculty Research Award, Mechanical Engineering, 2022.
- Best paper award at 13th European Wave and Tidal Energy Conference held in Napoli, Italy, September 2019 for the paper "*El Fajri, O., **Bhushan, S.**, Thompson, D. S., O'Doherty, T. Numerical investigation of shallow-water effects on hydrokinetic turbine wake recovery*."
- Nominated for 2019 Blavatnik National Awards for Young Scientists, Disciplinary category: Physical Sciences & Engineering. Nomination was based on University level recommendation.
- Outstanding Junior Faculty Research Award, Mechanical Engineering, 2017.
- Robert T. Knapp Award from the ASME Fluids and Engineering Division for the paper: "Analysis of Turbulence Generation and Energy Transfer Mechanisms in Boundary Layer Transition Using Direct Numerical Simulation," Paper No. FEDSM2016-7795.
- Outstanding Faculty Teaching award, Dept. Mechanical Engineering, 2016.
- Selected for Air Force Summer Faculty Fellow, Eglin Air Force Base, FL, US in June 1 – Aug. 9, 2015 and 2016.
- Nominated for Mississippi State University Faculty Research Award, 2015.
- NVIDIA Corporation awarded Tesla K20 to support the research "Development of Hybrid CPU/GPU Pseudo-Spectral Solver for Direct Numerical Simulations of Flat-Plate Boundary Layer Bypass Transition" under NVIDIA Hardware Donation Program, Fall 2013.
- Selected for Visiting Summer Faculty, Mathematics and Computer Science Division, Argonne National Lab, Argonne, IL, Aug. 10 - September 8, 2013.
- Selected for Argonne Training Program on Extreme Scale Computing (ATPESC), Argonne National Lab., July 28 - August 9, 2013.
- Best paper award (2nd Prize) Robertson E., **Bhushan S.**, and Walters D.K., Two- and Three-Dimensional Laminar and Turbulent Flow Simulations Using OpenFOAM, 2013 Region II AIAA Student Conference, 2013.
- Poster "*Development of a Graphical User Interface for Wall-Bounded and Free-Shear Turbulent Flows"* by M. Borse, Faculty Advisors: **Bhushan S.** and Walters D.K., Awarded: 1st Prize LSU Undergraduate Research Conference, October 2012.
- Poster "*Large Eddy Simulation of Channel and Jet Flows*," by P. Mitra and M. Borse, Faculty Advisors: **Bhushan S.** and Walters D.K., Awarded:
  3rd Prize at American Society of Engineering Education Conference, April 2012
  1st Prize MSU Summer Undergraduate Research Symposium, July 2012
- Honda Barrier Fellowship and Barrier Graduate Engineering Scholarship, 2001-2003 at Mississippi State University.
- MHRD scholarship for graduate studies, 1998-2000 at IIT Kharagpur, India.

SYNERGISTIC ACTIVITIES

Professional Association Participation:

- Committee Member, MAS Early Career Award Committee, 2021 – 2024.

- Vice-Chair (2022-2024), Secretary (200-2022), CFDTC Division, American Society of Mechanical Engineering.
- Mini-symposium "Numerical Methods and Models for High Performance Fluid/Structure Computations" organizer and chair for ICCMAE 2020: The Second International Conference on Computational Methods and Applications in Engineering. Starkville, MS, 2022.
- Co-organizer "Topic 5-8 Emerging Methods in CFD" at ASME 2020 Fluids Engineering Division Summer Meeting, July 2020.
- Vice-Chair, Physics and Engineering Division, Mississippi Academy of Science, FY19-20.
- Chair, Physics and Engineering Division, Mississippi Academy of Science, FY17-18, 18-19.
- Co-Chair, Physics and Engineering Division, Mississippi Academy of Science, FY16-17.
- Session Chair, DNS, LES and Hybrid RANS/LES Methods-II, ASME 2016 Fluids Engineering Division Summer Meeting. Washington, DC.
- *Undergraduate Research and Teaching Module for Turbulent Flow Visualization*: Developed a GUI interface for the parallel pseudo-spectral solver for canonical flow simulations, which is being used by undergraduate students at Aerospace and Mechanical Engineering at Mississippi State University to integrate research and education.
- Co-Convener (P. Prat, A. Parodi, **S. Bhushan** and A. Molini) AGU Fall Meeting Session: *Multiscaling in Climate and Hydrology*, NG008, San Francisco, CA, 3-7 December 2012.
- Co-organizer (**S. Bhushan** and D.K. Walters) for "Parallel CFD in Ship Aero and Hydrodynamics Minisymposium" at the *Parallel Computational Fluid Dynamics Conference 2012*, May 21-25, 2012 Atlanta, GA, USA.
- Member: *ASME, MAS*
- Journal Manuscript Reviewer: *International Journal for Numerical Methods in Fluids*, *AIAA*, *Computers and Fluids*, *Journal of Fluids Engineering, Journal of Hydrologic Engineering, Journal of Ship Research, Japan Society of Naval Architects and Ocean Engineers, Engineering Applications of Computational Fluid Mechanics, Physics of Fluids.*

Invited Tasks and Editorial Roles:

- Associate Editor, *Journal of Fluids Engineering*, 2023-2026.
- Guest Editor, Special Issue "Modeling of Ship Hydrodynamics" for *Journal of Marine Science and Engineering* (ISSN 2077-1312), 2020.
- Contributed to analysis of results for "*NATO AVT-253 Assessment of Prediction Methods for Large Amplitude Dynamic Manoeuvres for Naval Vehicles*." 2020.
- Contributed to analysis of results for "*NATO AVT-183 Reliable Prediction of Separated Flow and Onset and Progression for Air and Sea Vehicles*." 2015.
- Co-editor (F. Stern, **S. Bhushan**, H. S. Hossieni and M. Mousaviraad) of the "Analysis of G2010 Results for Seakeeping Test Cases 1.4a,b,c, 2.4, and 3.5," for the *Proceedings of Gothenburg 2010: A Workshop on CFD in Ship Hydrodynamics*, Dec. 8-10 2010, Gothenburg, Sweden. 2014.

Invited Talks and Workshops

- Invited Speaker, Mississippi High-Performance Computing Conference. March 26-27, 2024.
- Invited Speaker, Recent Advances in Marine Vehicles and Structures (RAMVS) conducted by Department of Civil Engineering, National Institute of Technology Calicut, India, 4th-8th October 2021.
- Seminar: "Computational Fluid Dynamics: Turbulence Modeling and Applications," Dept. of Physics and Astronomy, University of Mississippi, Jan. 28, 2020.
- Invited for Shri Gopal Rajgarhia International Faculty Outreach Programme (SGR IFOP) 2018 to give Lecture series on "*High Fidelity Computational Fluid Dynamics Simulations for Marine Applications*," Indian Institute of Technolgy, Kharagpur, India, Dec. 10-15, 2018.

- Seminar: “Turbulence Modeling: From Transition to DNS,” Civil & Environmental Engineering, Duke University, Nov. 13, 2017.
- Seminar: Transition and Turbulence Modeling. AFRL Summer Seminar Series, UF REEF auditorium, July 9, 2015.
- Guest Lecture, “Simulation Based Design for Engineering Applications (Fluid Systems)” Department of Physics, Atmospheric Sciences & Geoscience, Jackson State University, September 1, 2013. Invited by Dr. Duanjun Lu.

University Level Service

- Associate Director, CAVS CFD group.
- Panelist for BCoE Academic Insight, “Computational Fluid Dynamics (CFD) in ME.”
- ME Undergraduate Committee
- Chair, ME Thermodynamics Committee
- Chair, Fluid Mechanics PhD Qualifying Exam Committee
- Mechanical Engineering Library representative
- Faculty search committee
- Judge for Graduate Student Research Symposium, Mississippi State University.