

Publications & Invited Talks

Upcoming Books

(2) Author, Foundations of Data-driven Modeling for the Physical Sciences, Cambridge University Press, December 2022

(1) Editor, Data-driven Analysis and Modeling of Turbulent Flows, Elsevier, September 2022.

Submitted Journal articles

(73) Davoudi, B., Duraisamy, K., Krogius, M., Atkins, E., and Gaskell, P., "Physics-based Modeling for Autonomous Operation of Unmanned Aerial Systems in Extreme Gusts," Aeronautical Journal, 2022.

(72) Pradhan, A., and Duraisamy, K., "A unified perspective on scale-resolving simulations of turbulent flows using optimal finite element projections," Journal of Fluid Mechanics, 2022.

(71) Srivastava, V., Sulzer, V., Mohtat, P., Siegel, J., and Duraisamy, K., "Non-intrusive Physics-constrained Learning of Fuel Cell Model Augmentations," Computational Mechanics, 2022.

(70) Duvall, J., Duraisamy, K., and Pan, S., "Non-linear Independent Dual System (NIDS) for Discretization-independent Surrogate Modeling over Complex Geometries," Journal of Computational Physics, arXiv:2109.07018, 2021.

(69) Pradhan, A., and Duraisamy, K., "Data-Driven discovery of Variational Multiscale Closures: A unified approach to sub-grid modelling and super-resolution," Journal of Computational Physics, 2021.

Journal articles

(68) Huang, C., Duraisamy, K. and Merkle, C. "Component-based Reduced Order Modeling of Large-scale Complex Systems," Frontiers in Physics, 2022.

(67) Rezaian, E., Huang, C., and Duraisamy, K., "Non-intrusive Balancing Transformation of Highly Stiff Systems with Lightly-damped Impulse Response," Proc. Royal Society, Series A, 2022

(66) Jacobsen, C. and Duraisamy, K. "Disentangling Physical Fields Using Variational Autoencoders," Frontiers in Physics, 2022.

(65) Arnold-Medabalimi, N., Huang, C., and Duraisamy, K., "Large-Eddy Simulation and Challenges for Projection-based Reduced-Order Modeling of a Gas Turbine Model Combustor," International Journal of Spray and Combustion Dynamics, 2022.

(64) Gouasmi, A., Murman, S., and Duraisamy, K., "Entropy-Stable Schemes in the Low Mach Regime: Flux-Preconditioning, Entropy Breakdowns and Entropy Transfers," Journal of Computational Physics, 2021.

(63) Xu, J., Pradhan, A., and Duraisamy, K., "Conditionally Parameterized, Discretization-Aware Neural Networks for Mesh-Based Modeling of Physical Systems," Neural Information Processing Systems, 2021.

(62) Srivastava, V., Duraisamy, K., "Generalizable Physics-constrained Modeling using Learning and Inference assisted by Feature Space Engineering," Physical Review Fluids, 2021.

(61) Huang, C., Wentland, C., Duraisamy, K., and Merkle, C., "Model Reduction for Multi-scale Transport Problems using Model-form-Preserving Least Squares Projections with Variable Transformation," Journal of Computational Physics, 2021.

(60) Foti, D., and Duraisamy, K., "Sub-grid scale characterization and asymptotic behavior of multi-dimensional upwind schemes for the vorticity transport equations," Physical Review Fluids, 2021.

(59) Duraisamy, K. "Perspectives on Machine Learning-augmented Reynolds-averaged and Large Eddy Simulation Models of Turbulence," Physical Review Fluids, 2021.

(58) Pan, S., Arnold-Medabalimi, N., and Duraisamy, K., "Sparsity-promoting algorithms for the discovery of informative Koopman invariant subspaces," Journal of Fluid Mechanics, 2021.

(57) Xu, J., and Duraisamy, K., "Multi-level Convolutional Autoencoder Networks for Parametric Prediction of Spatio-temporal Dynamics," Computer Methods in Applied Mechanics & Engineering, 2020.

(56) Pan, S., and Duraisamy, K., "On the Structure of Time-delay Embedding in Linear Models of Non-linear Dynamical Systems," Chaos, 2020.

(55) Pradhan, A. and Duraisamy, K., "Variational Multiscale Closures for Finite Element Discretizations Using the Mori-Zwanzig Approach," Computer Methods in Applied Mechanics & Engineering, 2020.

- (54) Parish, E., Wentland, C., Duraisamy, K., "The Adjoint Petrov Galerkin Method for Non-linear Model Reduction," *Computer Methods in Applied Mechanics & Engineering*, 2020.
- (53) Foti, D., Giorno, S., and Duraisamy, K., "An adaptive mesh refinement approach based on optimal sparse sensing," *Theoretical and Computational Fluid Dynamics*, 2020.
- (52) Gouasmi, A., Duraisamy, K., and Murman, S., "Formulation of Entropy Stable Schemes for the Compressible Multicomponent Euler Equations," *Computer Methods in Applied Mechanics & Engineering*, 2020.
- (51) Davoudi, B., Taheri, E., Duraisamy, K., Jayaraman, B., Kolmanovsky, I., "Quad-rotor Flight Simulation in Realistic Atmospheric Conditions," *AIAA Journal*, 2020.
- (50) Gouasmi, A., Duraisamy, K., and Murman, S., "A minimum entropy principle in the compressible multicomponent Euler equations," *ESAIM: Mathematical Modelling and Numerical Analysis*, 2020.
- (49) Pan, S., and Duraisamy, K., "Physics-Informed Probabilistic Learning of Linear Embeddings of Non-linear Dynamics with Guaranteed Stability," *SIAM Journal on Applied Dynamical Systems*, 2020.
- (48) Xu, J., Huang, C., and Duraisamy, K., "Reduced Order Modeling Framework for Combustor Instabilities Using Truncated Domain Training," *AIAA Journal*, 2020.
- (47) Huang, C., Duraisamy, K., and Merkle, C., "Investigations and Improvement of Robustness of Reduced-Order Models of Reacting Flow," *AIAA Journal*, 2019.
- (46) Taira, S., Hemati, M., Brunton, S., Sun, Y., Duraisamy, K., Bagheri, S., Dawson, S., and Yeh, C-A., "Modal Analysis of Fluid Flows: Applications and Outlook," *AIAA Journal* 2019.
- (45) Bhatnagar, S., Afshar, Y., Pan, S., Duraisamy, K. and Kaushik, S., "Prediction of Aerodynamic Flow Fields Using Convolutional Neural Networks," *Computational Mechanics*, 2019.
- (44) Mishra, A., Duraisamy, K., and Iaccarino, G., "Estimating uncertainty in homogeneous turbulence evolution due to coarse-graining," *Physics of fluids*, 2019.
- (43) Duraisamy, K., Iaccarino, G., and Xiao, H., "Turbulence Modeling in the Age of Data," *Annual Review of Fluid Mechanics*, 2019.
- (42) Pan, S., and Duraisamy, K., "Long Time Predictive Modeling of Non-linear Dynamical Systems using Neural Networks," *Complexity*, 2018.
- (41) Pan, S., and Duraisamy, K., "Data-driven Discovery of Closure Models," *SIAM Journal on Applied Dynamical Systems*, 2018.
- (40) Gouasmi, A., Murman, S., Duraisamy, K., "Entropy Conservative Schemes and the Receding Flow Problem," *Journal of Scientific Computing*, 2018.
- (39) Foti, D., Duraisamy, K., "Multi-dimensional finite volume scheme for the vorticity transport equations," *Computers & Fluids*, 2018
- (38) Goel, A., Duraisamy, K., Bernstein, D., "Retrospective Cost Adaptive Control of Unstart in a Model Scramjet Combustor," *AIAA Journal* 56 (3), 2018.
- (37) Mishra, A., Davoudi, B., and Duraisamy, K., "Multiple-Fidelity Modeling of Interactional Aerodynamics" *Journal of Aircraft*, 1-16, 2018.
- (36) Chia, M., Duraisamy, K., Padthe, A., and Friedmann, P., "Active and Passive Helicopter Noise Reduction using the AVINOR/HELINOR Code Suite," *Journal of Aircraft*, 2017, 37 pages.
- (35) Gouasmi, A., Parish, E., and Duraisamy, K., "A Priori Estimation of Memory Effects in Reduced Order Modeling of Nonlinear Systems Using the Mori-Zwanzig formalism, *Proc. Royal Soc. Ser A*, Vol. 473, 2017, 24 pages.
- (34) Parish, E., and Duraisamy, K., "A Dynamic Sub-grid Scale Model for Large Eddy Simulations based on the Mori-Zwanzig formalism," *Journal of Computational Physics*, Vol. 349, 2017, 17 pages.
- (33) Chia, M., Padthe, A., Duraisamy, K., and Friedmann, P., "An Efficient Approach to Simulation and On-Blade Control of Helicopter Noise and Vibration," *Journal of the American Helicopter Society*, 2017, 37 pages.
- (32) Singh, A., Medida, S., and Duraisamy, K., "Machine Learning-augmented Predictive Modeling of Turbulent Separated Flows over Airfoils," *AIAA Journal*, 2017, 14 pages.
- (31) Parish, E., and Duraisamy, K., "Non-Markovian closure models for Large Eddy Simulations based on the Mori-Zwanzig formalism," *Physical Review: Fluids*, Vol. 2, 2017, 33 pages.
- (30) Aranake, A., and Duraisamy, K., "Aerodynamic Optimization of Shrouded Wind Turbines," *Wind Energy*, Vol. 20, 2017, 13 pages.

- (29) Campos, A., Duraisamy, K., and Iaccarino, G., "An Eulerian Formulation of the Interacting Particle Representation Model of Homogeneous Turbulence," *Physical Review: Fluids*, Vol. 1, 2016, 41 pages.
- (28) Mishra, A., Duraisamy, K., and Iaccarino, G., "Sensitivity of Flow Evolution to Turbulence Structure," *Physical Review: Fluids*, Vol. 1, 2016, 9 pages.
- (27) Singh, A., and Duraisamy, K., "Using Field Inversion to Quantify Functional Errors in Turbulence Closures," *Physics of Fluids*, Vol. 28, 2016, 22 pages.
- (26) Parish, E., and Duraisamy, K., "A Paradigm for Data-driven Predictive Modeling Using Field Inversion and Machine Learning," *Journal of Computational Physics*, Vol. 305, 2016, 16 pages.
- (25) Ryu, S., Emory, M., Iaccarino, G., Campos, A., and Duraisamy, K., "Large-eddy simulation of a wing-body junction flow," *AIAA Journal*, Vol. 54, 2016, 12 pages.
- (24) Bremseth, J., and Duraisamy, K., "Computational Analysis of Vertical Axis Wind Turbine Arrays," *Theoretical and Computational Fluid Dynamics*, 2016, 15 pages.
- (23) Parish, E., Duraisamy, K., and Chandrashekar, P., "Generalized Riemann Problem-based Upwind Scheme for the Vorticity Transport Equations," *Computers and Fluids*, Volume 132, 2016, 9 pages.
- (22) Campos, A., Duraisamy, K., and Iaccarino, G., "A Segregated, Explicit Algebraic Structure-based Model for Wall-bounded Turbulent Flows," *International Journal of Heat and Fluid Flow*, 2016, 16 pages.
- (21) Lakshminarayan, V., and Duraisamy, K., "Adjoint-based Estimation and Control of Spatial, Temporal and Stochastic Approximation Errors in Unsteady Flow Simulations," *Computers and Fluids*, Vol. 121, 2015, 12 pages.
- (20) Aranake, A., Lakshminarayan, V., and Duraisamy, K., "Computational Analysis of Shrouded Wind Turbine Configurations," *Renewable Energy*, Vol. 75, 2015, 15 pages.
- (19) Aranake, A., Lakshminarayan, V., and Duraisamy, K., "Assessment of low-order theories for analysis and design of shrouded wind turbines using CFD," *Journal of Physics: Conf. Ser.* Vol. 524, 2014, 10 pages.
- (18) Morgan, B., Duraisamy, K., and Lele, S., "Large-Eddy Simulations of a Normal Shock Train in a Constant-Area Isolator," *AIAA Journal*, Vol. 52(3), 2014, 20 pages.
- (17) Morgan, B., Duraisamy, K., Nguyen, N., Kawai, S., and Lele, S., "Flow physics and RANS modeling of oblique shock / boundary layer interactions," *Journal of Fluid Mechanics*, Vol. 729, 2013, 53 pages.
- (16) Thom, A., and Duraisamy, K., "Computational Investigation of Unsteadiness in Propeller Wake-Wing Interactions," *AIAA Journal of Aircraft*, Vol. 50(3), 2013, 4 pages.
- (15) Duraisamy, K., and Chandrashekar, P., "Goal-oriented Estimation and Control of Numerical Error using Stochastic Adjoints," *Computers and Fluids*, Vol. 66, 2012, 11 pages.
- (14) Palacios, F., Duraisamy, K., Alonso, J., and Zuazua, E., "Robust Grid Adaptation for Efficient Uncertainty Quantification," *AIAA Journal*, Vol. 50 (7), 2012, 9 pages.
- (13) Wang, Q., Duraisamy, K., Alonso, J., and Iaccarino, G. "Risk Assessment of Hypersonic Flow Simulations Using Adjoint- Based Sampling Methods," *AIAA Journal*, Vol. 50 (3) 2011, 15 pages.
- (12) Baeder, J., Duraisamy, K., and Lakshminarayan, V. "RANS Predictions of Complex Hovering Rotor Configurations: From Micro Scale to Full Scale," *Computational Fluid Dynamics Journal*, Vol. 18 (3-4), 2011, 57 pages.
- (11) DeVito, Z., Joubert, N., ..., Duraisamy, K., Hanrahan, H., "Liszt: A Domain Specific Language for Building Portable Mesh-based PDE Solvers," *Supercomputing*, 2011, 11 pages.
- (10) Hussain, F., and Duraisamy, K., "Mechanics of Viscous Vortex Reconnection," *Physics of Fluids*, Vol. 23 (2), 2011, 5 pages.
- (9) Thom, A., and Duraisamy, K., "High Resolution Simulation of Parallel Blade-Vortex Interaction," *AIAA Journal*, Vol. 48 (10), 2010, 12 pages.
- (8) Kim, H., Kenyon, A., Brown, R., and Duraisamy, K., "Interactional Aerodynamics and Acoustics of a Hingeless Coaxial Helicopter with an Auxiliary Propeller in Forward Flight," *Aeronautical Journal*, Vol. 113, 2009, 14 pages.
- (7) Duraisamy, K., and Lele, S., "Evolution of Isolated Turbulent Trailing Vortices," *Physics of Fluids*, Vol. 20, 2008, 11 pages.

- (6) Duraisamy, K., and Baeder, J., "Implicit Scheme for Hyperbolic Conservation Laws using Non-oscillatory Reconstruction in Space and Time," SIAM Journal of Scientific Computing, Vol. 29 (6), 2007, 14 pages.
- (5) Duraisamy, K., Ramasamy, M., Baeder, J., and Leishman, G., "High Resolution Computational and Experimental Study of Rotary-Wing Tip Vortex Formation," AIAA Journal, Vol. 45 (11), 2007, 10 pages.
- (4) Duraisamy, K., McCroskey, W., and Baeder, J., "Analysis of Wind Tunnel Wall Interference Effects on Unsteady Subsonic Airfoils," AIAA Journal of Aircraft, Vol. 44 (5), 2007, 18 pages.
- (3) Duraisamy, K., and Baeder, J., "High Resolution Wake Capturing Methodology for Hovering Rotor Simulations," Journal of the American Helicopter Society, Vol. 52 (2), 2007, 13 pages.
- (2) Duraisamy, K., and Baeder, J., "Numerical Simulation of the Effects of Spanwise Blowing on Wing-Tip Vortex Formation and Evolution," AIAA Journal of Aircraft, Vol. 43 (4), 2006, 11 pages.
- (1) Duraisamy, K., Baeder, J., and Liu, J-G., "Concepts and Applications of Time-Limiting to High-Resolution Schemes," Journal of Scientific Computing, Vol. 1-3, December 2003, 14 pages.

Refereed conference or symposium proceedings papers

- (84) Pacini, B., Yildirim, A., Davoudi, B., Martins, J., and Duraisamy, K., Aerodynamic and Aeroacoustic Optimization for Urban Air Mobility Vehicle Design, AIAA Aviation, 2021.
- (83) Rezaian, E., Biswas, R., and Duraisamy, K., "Non-Intrusive Parametric Reduced Order Models For The Prediction Of Internal And External Flow Fields Over Automobile Geometries," International Mechanical Engineering Congress and Exposition, 2021.
- (82) Arnold-Medabalimi, N., Huang, C., and Duraisamy, K., Reduced Order Modeling for GasTurbine Combustion Dynamics, Symposium on Thermoacoustics in Combustion: Industry meets Academia, Munich, Germany, 2021.
- (81) Tekriwal, M., Duraisamy, K., and Jeannin, J., "A formal proof of the Lax equivalence theorem for finite difference schemes," NASA Formal Methods, 2021 [Journal quality].
- (80) Wentland, C., Huang, C., and Duraisamy, K., "Investigation of Sampling Strategies for Reduced-Order Models of Rocket Combustors. AIAA Scitech, Nashville, TN, Jan 2021.
- (79) Huang, C., Duraisamy, K., and Merkle, C., "Data-Informed Species Limiters for Local Robustness Control of Reduced-Order Models of Reacting Flow," AIAA Scitech, Orlando, FL, Jan 2020.
- (78) Davoudi, B., and Duraisamy, K., "A Hybrid Blade Element Momentum Model for Flight Simulation of Rotary Wing Unmanned Aerial Vehicles," AIAA Aviation, Dallas, TX, June 2019.
- (77) Foti, D., and Duraisamy, K., "Implicit Large-Eddy Simulation of Wind Turbine Wakes and Turbine-Wake Interactions using the Vorticity Transport Equations," AIAA Aviation, Dallas, TX, June 2019.
- (76) Holland, J., Baeder, J., and Duraisamy, K., "Field Inversion and Machine Learning With Embedded Neural Networks: Physics-Consistent Neural Network Training," AIAA Aviation, Dallas, TX, June 2019.
- (75) Wentland, C., Huang, C., and Duraisamy, K., "Closure of Reacting Flow Reduced-Order Models via the Adjoint Petrov-Galerkin Method," AIAA Aviation, Dallas, TX, June 2019.
- (74) Holland, J., Baeder, J., and Duraisamy, K., "Towards Integrated Field Inversion and Machine Learning With Embedded Neural Networks for RANS Modeling," AIAA Scitech, San Diego, CA, Jan 2019.
- (73) Sharma, A., Xu, J., Friedmann, P., and Duraisamy, K., "Simulation of Maritime Helicopter Dynamics During Approach to Landing With Time-Accurate Wind-Over-Deck," AIAA Scitech, San Diego, CA, Jan 2019.
- (72) Huang, C., Duraisamy, K., and Merkle, C., "Investigations and Improvement of Robustness of Reduced-Order Models of Reacting Flow, AIAA Scitech, San Diego, CA, Jan 2019.
- (71) Goel, A., Duraisamy, K., and Bernstein, D., " Output-Constrained Adaptive Control for Unstart Prevention in a 2D Scramjet Combustor," AIAA Scitech, San Diego, CA, Jan 2019.
- (70) Comer, A., Huang, C., Duraisamy, K., Sardeshmukh, S., Rankin, B., Harvazinski, M., and Sankaran, V., "Sensitivity Analysis of Bluff Body Stabilized Premixed Flame Large Eddy Simulations," AIAA Scitech, San Diego, CA, Jan 2019.
- (69) Bush, B., Chyczewski, T., Duraisamy, K., Eisfeld, B., Rumsey, C., and Smith, B., "Recommendations for Future Efforts in RANS Modeling and Simulation," AIAA Scitech, San Diego, CA, Jan 2019.

- (68) Xu, J., Huang, C., Duraisamy, K., and Merkle, C., "Multi-Domain Framework for Reduced Order Modeling of Rocket Combustion Instabilities," AIAA/SAE/ASME Joint Propulsion Conference, Cincinnati, OH, July 2018.
- (67) Huang, C., Duraisamy, K., and Merkle, C., "Challenges in Reduced-Order Modeling of Reacting Flows," AIAA/SAE/ASME Joint Propulsion Conference, Cincinnati, OH, July 2018.
- (66) Foti, D., and Duraisamy, K., "An Investigation of an Implicit Large Eddy Simulation Framework for the Vorticity Transport Equations," AIAA Fluid Dynamics Conference, Atlanta, GA, Jun 2018.
- (65) Srivastava, V., and Duraisamy, K., "Aerodynamic Design of Aircraft Engine Nozzles with Consideration of Model Form Uncertainties," AIAA Non-Deterministic Approaches Conference, Orlando, FL, Jan 2018.
- (64) Huang, C., Xu, J., Duraisamy, K., and Merkle, C., "Exploration of Reduced-Order Models for Rocket Combustion Applications," AIAA Aerospace Sciences Meeting, Orlando, FL, Jan 2018.
- (63) Xu, J., and Duraisamy, K., "Reduced Order Reconstruction of Model Rocket Combustor Flows," AIAA/SAE/ASME Joint Propulsion Conference, Atlanta, GA, July 2017.
- (62) Mishra, A., Davoudi, B., and Duraisamy, K., "Multiple Fidelity Modeling of Interactional Aerodynamics," AIAA Aviation, Denver, CO, June 2017.
- (61) Singh, A., Matai, R., Duraisamy, K., Durbin, P., "Data-driven augmentation of turbulence models for adverse pressure gradient flows," AIAA Aviation, Denver, CO, June 2017.
- (60) Kenway, G., Mishra, A., Duraisamy, K., and Martins, J., "An Efficient Parallel Overset Method for Aerodynamic Shape Optimization," AIAA Scitech, Dallas, TX, Jan 2017.
- (59) Alonso, J., Eldred, M., Constantine, P., Duraisamy, K., Farhat, C., Iaccarino and G. Jakeman, J., "Scalable Environment for Quantification of Uncertainty and Optimization in Industrial Applications (SEQUOIA)," AIAA Scitech, Dallas, TX, Jan 2017.
- (58) Chia, M., Duraisamy, K., Padthe, A., and Friedmann, P., "The HELINOIR Aeroacoustic Code and its Application to Active/Passive Helicopter Noise Reduction," AIAA Scitech, Dallas, TX, Jan 2017.
- (57) Singh, A., Duraisamy, K. and Zhang, Z., "Augmentation of Turbulence Models Using Field Inversion and Machine Learning," AIAA Scitech, Dallas, TX, Jan 2017.
- (56) Singh, A., Duraisamy, K. and Pan, S., "Characterizing and Improving Predictive Accuracy in Shock-Turbulent Boundary Layer Interactions Using Data-driven Models," AIAA Scitech, Dallas, TX, Jan 2017.
- (55) Arnold-Medabalimi, N., and Duraisamy, K., "Flamelet-based RANS Computations of Supersonic Reacting Flows in a Model Scramjet Combustor," AIAA Aviation, Washington, DC, June 2016.
- (54) Srivastava, K., and Duraisamy, K., "Influence of Vortical Interactions on Thunniform Fish Motions," AIAA Aviation, Washington, DC, June 2016.
- (53) Parish, E., and Duraisamy, K., "Reduced Order Modeling of Turbulent Flows Using Statistical Coarse-graining," AIAA Aviation, Washington, DC, June 2016.
- (52) Goel, A., Duraisamy, K., and Bernstein, D., "Parameter Estimation in the Burgers Equation Using Retrospective-Cost Model Refinement," American Control Conference, Boston, MA, July 2016.
- (51) Chia, M., Padthe, A., Duraisamy, K., and Friedmann, P., "An Efficient Approach to Simulation and On-Blade Control of Helicopter Noise and Vibration," 72nd Annual Forum of the American Helicopter Society, West Palm Beach, Florida, May 2016.
- (50) Duraisamy, K., and Singh, A., "Informing Turbulence Closures with Computational and Experimental Data," AIAA SCITECH Conference, San Diego, Ca, Jan 2016.
- (49) Marley, C., and Duraisamy, K., "Reduced Order Modeling of Compressible Flows with Unsteady Normal Shock Motion," 51st AIAA/SAE/ASME Joint Propulsion Conference, Orlando, FL, July 2015.
- (48) Goel, A., Xie, A., Duraisamy, K., and Bernstein, D., "Retrospective Cost Adaptive Thrust Control of a 1D Scramjet with Mach Number Disturbance," American Control Conference, Chicago, IL, July 2015.
- (47) Zhang, Z. and Duraisamy, K., "Machine Learning Methods for Data-Driven Turbulence Modeling," AIAA Aviation 2015, Dallas, TX, June 2015.
- (46) Parish, E., and Duraisamy, K., "Quantification of Turbulence Modeling Uncertainties Using Full Field Inversion," AIAA Aviation 2015, Dallas, TX, June 2015.
- (45) Duraisamy, K., Zhang, Z., and Singh, A., "New approaches to Turbulence and Transition Modeling using Data Driven Techniques," AIAA Scitech 2015, Orlando, Jan 2015.
- (44) Tracey, B., Duraisamy, K., and Alonso, J., "A Machine Learning Strategy to Assist Turbulence Model Development," AIAA Scitech 2015, Orlando, Jan 2015.

- (43) Panagiotou, C., Kassinos, S., Potsdam, M., and Duraisamy, K., "Algebraic Structured-Based Model (ASBM): Prediction of Static Stall Over the VR7 Rotorcraft Airfoil," 10th International ERCOFTAC Symposium on Engineering Turbulence Modelling and Measurements, Marbella, Spain, Sep 2014.
- (42) Lakshminarayan, V., and Duraisamy, K., "Flow Physics and Performance of Vertical Axis Wind Turbine Arrays," 32nd AIAA Applied Aerodynamics Conference, Atlanta, June 2014.
- (41) Singh, A. P., and Duraisamy, K., "Multi Fidelity Aerodynamic Design of Ducted Microscale Rotor Systems," AHS Forum 70, Montreal, May 2014.
- (40) Pankonien A., Duraisamy, K., Faria, C., Inman, D., "Synergistic Smart Morphing Aileron: Aero-structural Performance Analysis," AIAA SCITECH 2014, Washington DC, January 2014.
- (39) Campos, A., Duraisamy, K. and Iaccarino, G., "Towards a Two-equation Algebraic Structure-Based Model with applications to Turbulent Separated Flows," 43rd AIAA Fluid Dynamics Conference, San Diego, California, 2013.
- (38) Taylor, T., Palacios, F., Duraisamy, K. and Alonso, J., "A hybrid adjoint approach applied to turbulent flow simulations," 21st AIAA CFD Conference, San Diego, California, 2013.
- (37) Aranake, A., Lakshminarayan, V., and Duraisamy, K., "Analysis and Design of Shrouded Wind Turbines," ASME Wind Turbine Symposium, Dallas, January 2013.
- (36) Lakshminarayan, V., Duraisamy, K., and Alonso, J., "Estimation and Adaptive Control of Spatial, Temporal and Stochastic Errors Using Adjoint for Wind Turbine Applications," 51st AIAA ASM Meeting, Dallas, Texas, January 2013.
- (35) Tracey, B., Duraisamy, K., and Alonso, J., "Using Supervised Learning to Improve Epistemic Uncertainty Quantification in RANS Modeling," 51st AIAA ASM Meeting, Dallas, Texas, January 2013.
- (34) Colonno, M., Naik, K., Duraisamy, K., and Alonso, J., "An adjoint-based multidisciplinary optimization framework for rotorcraft systems," 14th AIAA Multidisciplinary Optimization Conference, Indianapolis, Indiana, September 2012.
- (33) Aranake, A., Lakshminarayan, V., and Duraisamy, K., "Detailed Assessment of CFD Methodology and Transition Model for the Analysis of Wind Turbine Flow fields," 30th AIAA Applied Aerodynamics Conference, New Orleans, Louisiana, June 2012.
- (32) Taylor, T., Palacios, F., Duraisamy, K., and Alonso, J., "Towards a Hybrid Adjoint Approach for Arbitrarily Complex Partial Differential Equations," 30th AIAA Applied Aerodynamics Conference, New Orleans, Louisiana, June, 2012.
- (31) Duraisamy, K., and Alonso, J., "Adjoint Based Techniques for Uncertainty Quantification in Turbulent Flows with Combustion," 30th AIAA Applied Aerodynamics Conference, New Orleans, Louisiana, June 2012.
- (30) Morgan, B., Duraisamy, K., and Lele, S., "Large-Eddy and RANS Simulations of a Normal Shock Train in a Constant-Area Isolator," 50th AIAA Aerospace Sciences Meeting, Nashville, Tennessee, Jan, 2012.
- (29) Fike, J., Duraisamy, K., Alonso, J., Do, H., Im, S-K., and Cappelli, M., "Experimental and Computational Investigation of Unstart Due to Mass Injection," 29th AIAA Applied Aerodynamics Conference, Honolulu, Hawaii, June 2011.
- (28) Witteveen, J., Duraisamy, K., and Iaccarino, G., "Uncertainty Quantification and Error Estimation in Scramjet Simulation," 17th AIAA International Space Planes and Hypersonic Systems and Technology Conference, San Francisco, California, Apr 2011.
- (27) Bueno, A., Castro, C., Duraisamy, K., Palacios, F., and Zuazua, E., "When is the Discrete Gradient not useful in Optimal Shape design?," 49th Aerospace Sciences Meeting, Orlando, Florida, Jan, 2011.
- (26) Hussain, F., and Duraisamy, K., "Scaling Laws in Vortex Reconnection," 13th Asian Congress of Fluid Mechanics, Dhaka, Bangladesh, Dec, 2010.
- (25) Wang, Q., Duraisamy, K., Alonso, J., and Iaccarino, G. "Risk Assessment of Hypersonic Flow Simulations Using Adjoint- Based Sampling Methods," 12th AIAA Non-Deterministic Approaches Conference, Orlando Florida, Apr, 2010.
- (24) Duraisamy, K., Alonso, J., Palacios, F., and Chandrasekhar, P., "Adjoint Based Error Estimation for High Speed Flow Computations," 48th Aerospace Sciences Meeting, Orlando, Florida, Jan, 2010.
- (23) Thom, A., and Duraisamy, K., "Numerical Investigation of the Aerodynamics and Acoustics of Head-On Blade-Vortex Interaction," 65th American Helicopter Society Annual Forum, Dallas, May, 2009.
- (22) Fletcher, T., Duraisamy, K., and Brown, R., "Sensitivity of Tail Rotor Noise to Helicopter Configuration in Forward Flight," 65th American Helicopter Society Annual Forum, Dallas, May, 2009.

- (21) Kim, H., Duraisamy, K., and Brown, R., "Effect of Rotor Stiffness and Lift Offset on the Aeroacoustics of a Coaxial Rotor in Level Flight," 65th American Helicopter Society Annual Forum, Dallas, May, 2009.
- (20) Fletcher, T., Duraisamy, K., and Brown, R., "Aeroacoustic Analysis of Main Rotor - Tail Rotor Interaction," 34th European Rotorcraft Forum, Liverpool, England, September, 2008.
- (19) Thom, A., and Duraisamy, K., "High Resolution Computation of the Aerodynamics and Acoustics of Blade-Vortex Interaction," 34th European Rotorcraft Forum, Liverpool, England, September, 2008.
- (18) Kim, H., Duraisamy, K., and Brown, R., "Aeroacoustics of a Coaxial Rotor," 64th American Helicopter Society Annual Forum, Montreal, Canada, May, 2008.
- (17) Duraisamy, K., and Brown, R., "Aerodynamic Response of a Hovering Rotor to Ramp Change in Pitch Input," 64th American Helicopter Society Annual Forum, Montreal, Canada, May, 2008.
- (16) Kim, H., Kenyon, A., Duraisamy, K., and Brown, R., "Aerodynamics and Acoustics of a Thrust Compounded Coaxial Rotor Configuration," AHS Specialist's Conference on Aeromechanics, San Francisco, CA, Jan 2008.
- (15) Kelly, M., Duraisamy, K., and Brown, R., "Prediction of Blade Vortex Interaction, Airloads and Acoustics of the HART Rotor using the Vorticity Transport Model," AHS Specialist's Conference on Aeromechanics, San Francisco, CA, Jan 2008.
- (14) Duraisamy, K., and Lele, S., "Turbulent Transport in Isolated Trailing Vortices," Turbulence and Shear Flow Phenomena 5, Munich, Germany, August 2007.
- (12) Revell, A., Duraisamy, K., and Iaccarino, G., "Advanced Turbulence Modelling of Wingtip Vortices," Turbulence and Shear Flow Phenomena 5, Munich, Germany, August 2007.
- (11) Lakshminarayan, V., Duraisamy, K., and Baeder, J., "Computational Investigation of Coaxial Rotor Aerodynamics," 63rd American Helicopter Society Annual Forum, Virginia Beach, Virginia, May, 2007.
- (10) Duraisamy, K., McCroskey, W., and Baeder, J., "Analysis of Wind Tunnel Wall Interference Effects on Unsteady Subsonic Airfoils," 24th AIAA Applied Aerodynamics Conference, San Francisco, California, June 2006.
- (9) Duraisamy, K., Ramasamy, M., Baeder, J., and Leishman, G., "Computational and Experimental Study of Hovering Rotor Tip Vortex Formation," 62nd Annual Forum of the American Helicopter Society, Phoenix, Arizona, May 2006.
- (8) Duraisamy, K., Sitaraman, J. and Baeder, J., "High Resolution Wake Capturing Methodology for Accurate Simulation of Rotor Aerodynamics," 61st Annual Forum of the American Helicopter Society, Grapevine, Texas, June 2005.
- (7) Duraisamy, K., and Baeder, J., "Numerical Simulation of the Effects of Spanwise Blowing on Wing-Tip Vortex Formation and Evolution," 23rd AIAA Applied Aerodynamics Conference, Toronto, Canada, June 2005.
- (6) Duraisamy, K., and Baeder, J., "Control of Helicopter Rotor Tip Vortex Structure using Upper Surface Blowing", 60th Annual Forum of the American Helicopter Society, Baltimore, Maryland, June 2004.
- (5) Duraisamy, K., and Baeder, J., "A New High Order Implicit Scheme using Non-Oscillatory Reconstruction in Space and Time," 42nd AIAA Aerospace Sciences Meeting and Exhibit, Reno, Nevada, Jan 2004.
- (4) Duraisamy, K., and Baeder, J., "Control of Tip Vortex Structure using Steady and Oscillatory Blowing," 21st Applied Aerodynamics Conference, Orlando, Florida, June 2003.
- (3) Garg, U., Shende, N., Duraisamy, K., and Balakrishnan N., "An Embedded Grid Adaptation Strategy for Unstructured Grid Based Finite Volume Computations," 2nd International Conference on Computational Fluid Dynamics, Sydney, Australia, July 2002.
- (2) Duraisamy, K., and Baeder, J., "A New Class of Higher Order Accurate Non-Oscillatory Implicit Time Integration Schemes," 8th AIAA/CEAS Aeroacoustics Conference, Breckenridge, Colorado, June 2002.
- (1) Duraisamy, K., and Baeder, J., "Active Flow Control Concepts for Rotor Airfoils using Synthetic Jets", 1st AIAA Flow Control Conference, St. Louis, Missouri, June 2002.

Government, university, or industrial reports

- (13) Duraisamy, K., Spalart, P., Rumsey, C., "Status, Emerging Ideas and Future Directions of Turbulence Modeling Research in Aeronautics," NASA Technical Memorandum 2017-219692, 2017.

- (12) Duraisamy, K., "Data-enabled, Physics-constrained Predictive Modeling of Complex Systems," SIAM News, July 2017.
- (11) Parish, E., and Duraisamy, K., "Dynamic Subgrid Scale Model for LES based on the Mori-Zwanzig Formalism," Proceedings of the CTR Summer Program, Stanford University, Stanford, California, 2016.
- (10) Mishra, A., Duraisamy, K., and Iaccarino, G., "Epistemic Uncertainty in Statistical Markovian Turbulence Models," Annual Research Briefs, Center for Turbulence Research, Stanford University, Stanford, California, 2015.
- (9) Duraisamy, K. and Durbin, P., "Transition modeling using data driven approaches," Proceedings of the CTR Summer Program, Stanford University, Stanford, California, 2014.
- (8) Eldred, M., Domino, S., Barone, M., Jakeman, J., Alonso, J., Duraisamy, K., Iaccarino, G., Tang, G., and Xiu, D., "Advances in UQ for Wind Energy Applications," Sandia National Laboratory Report SAND2013-0951C, 2013.
- (7) Alonso, J., Duraisamy, K., Iaccarino, G., Tang, G., Witteveen, J., Barone, M., Domino, S., Eldred, M., and Xiu, D., "Large-Scale Uncertainty and Error Analysis for Time-dependent Fluid/Structure Interactions in Wind Turbine Applications," Sandia National Laboratory Report SAND2012-1807C, 2012.
- (6) Pecnik, R., O'Sullivan, J., Duraisamy, K., Kassinos, S., Radhakrishnan, H., Iaccarino, G., "Improvement of Algebraic Structure Based Models and Application to Complex Flows," Proceedings of the CTR Summer Program, Stanford University, Stanford, California, 2012.
- (5) Palacios, F., Duraisamy, K., and Alonso, J., "Improvement of Adjoint-based Methods for Efficient Computation of Response Surfaces," Annual Research Briefs, Center for Turbulence Research, Stanford University, Stanford, California, 2009.
- (4) Duraisamy, K., and Lele, S., "DNS of Isolated Vortex Evolution," Proceedings of the CTR Summer Program, Stanford University, Stanford, California, 2006.
- (3) Duraisamy, K., and Iaccarino, G., "Curvature correction and application of the v2-f turbulence model to tip vortex flows," Annual Research Briefs, Center for Turbulence Research, Stanford University, Stanford, California, 2005.
- (2) Hahn, S., Alonso, J., Baeder, J., Duraisamy, K., Iaccarino, G., Lele, S., Moin, P., Schmitz, F., Shoeybi, M., and Wu, Z., "Progress on Hybrid Unsteady Simulation of Helicopter Rotor Flow," Annual Research Briefs, Center for Turbulence Research, Stanford University, Stanford, California, 2005.
- (1) Duraisamy, K., and Baeder, J., "Validation of Synthetic Jet Control using RANS and DES Tools," NASA Langley Research Center Workshop on CFD Validation of Synthetic Jets and Turbulent Separation Control, Williamsburg, Virginia, March 2004.

Invited presentations (Virtual presentations in Green)

Departmental/Institute colloquia

- (13) Mechanical & Aerospace Engineering, Notre Dame University, Nov 2022.
- (12) Mechanical Engineering, Rice University, Mar 2021
- (11) Mathematics, Pennsylvania State University, PA, Sep 2019
- (10) Mechanical/Aerospace/Nuclear, RPI, Troy, NY, Apr 2019
- (9) Mathematics, University of Michigan, Ann Arbor, MI, Jan 2019
- (8) Mathematics, University of California, Berkeley, CA, Nov 2018
- (7) Aerospace Engineering, University of Kansas, Lawrence, KS, Apr 2018
- (6) Mechanical Engineering, Stanford University, Stanford, CA, Sep 2017
- (5) Ecole Des Mines Des Paris, Sophie Antipolis, France, Dec 2016.
- (4) Aerospace Engineering, University of Washington, Seattle, WA, March 2016.
- (3) Aerospace Engineering, University of Illinois, Urbana Champaign, Feb 2016.
- (2) Aerospace Engineering, Indian Institute of Science, Bangalore, India, Dec 2012
- (1) Mathematics, Tata Institute of Fundamental Research, Bangalore, India, Dec 2009.

Invited Talks / Keynotes / Plenaries at conferences & workshops

- (45) Symposium Keynote, WCCM, Tokyo, August 2022.
- (44) Data-driven and Equations-informed tools for Complex Flows and Complex Fluids: Challenges and Benchmarks towards a quantitative AI, Rome, July 2022.
- (43) Distinguished lecture, Generation IV & Small reactors, Canadian Nuclear Society, Nov 2021.
- (42) Turing Institute Data-centric Engineering Seminar Series, London, Oct 2021.
- (41) Keynote, Machine Learning for Prediction and Control of Fluid Flows, Euromech, Paris , Jun 2021
- (40) Lawrence Livermore National Labs, Livermore, California, March 2021.
- (40) Physics Informed Machine Learning Workshop (ARPA-E), July 2020.
- (39) Institute for Computational & Experimental Research In Mathematics (Workshop on Algorithms for Dimension and Complexity Reduction), Providence, RI, March 2020.
- (38) Workshop on Data Centric Engineering, MIT, Cambridge, MA, Dec 2019.
- (37) European Numerical Mathematics and Advanced Applications, Egmond aan Zee, Netherlands, Sep 2019.
- (36) Plenary, Computational Sciences and AI in Industry (CSAI): new digital technologies for solving future societal and economical challenges, Jyvaskyla, Finland, June 2019.
- (35) Physics Informed Machine Learning, Seattle, WA, June 2019.
- (34) SIAM CSE, Spokane, WA, Feb 2019.
- (33) Keynote, High Fidelity Industrial LES/DNS, Brussels, Belgium, November 2018.
- (32) UTRC, Hartford, CT, Aug 2018.
- (31) WCCM, New York, NY, July 2018.
- (30) SIAM UQ, Los Angeles, CA, April 2018.
- (29) US/Japan Meeting on Data-driven methods for Fluids, Tokyo, Japan, Apr 2018.
- (28) Institute of Mathematics and Applications (Digital Twins workshop), Minneapolis, MN, March 2018.
- (27) Ansys, Pittsburgh, PA, Feb 2018.
- (26) Physics Informed Machine Learning, Santa Fe, NM, Jan 2018
- (25) Future CFD Technologies (NASA), Orlando, FL, Jan 2018
- (24) AIAA Scitech, Orlando, FL, Jan 2018
- (23) DLR, Braunschweig, Germany, Oct 2017.
- (22) Lawrence Livermore National Laboratories, Livermore, CA, Sep 2017.
- (21) Plenary, NASA Symposium on Advances in Turbulence Modeling, Ann arbor, MI July 2017.
- (20) AIAA Aviation Special Session on Model Reduction for CFD, Denver, CO, June 2017
- (19) USACM Workshop on UQ and Data-driven Modeling, Austin, TX, March 2017.
- (18) UTRC, Hartford, CT, March 2017.
- (17) SIAM CSE, Atlanta, GA, Feb 2017.
- (16) Data-Driven Methods for Reduced-Order Modeling and Stochastic Partial Differential Equations, Banff Research Station, Canada, Jan 2017.
- (15) Naval Surface Warfare Center, Bethesda, MD, Nov 2016.
- (14) Models, Dynamics & Learning (DARPA), Santa Barbara, CA, Nov 2016.
- (13) Machine Learning Technologies and their Applications to Scientific and Engineering Domains, NASA Langley Workshop, Langley, VA, August 2016.
- (12) SIAM Annual Meeting, Boston, MA, July 2016
- (11) ECCOMAS, Crete, Greece, June 2016.
- (10) NASA Langley Big-Data Seminar Series, Langley, VA, May 2016.
- (9) SIAM UQ Conference, Lausanne, Switzerland, Apr 2016.
- (8) Physics Informed Machine Learning (DoE), Santa Fe, NM, Jan 2016.
- (7) AIAA SCITECH 2016 Conference, San Diego, CA, Jan 2016.
- (6) Plenary, MACCCR Fuels Research Review Meeting, Lawrence Livermore National Labs, Livermore, CA, Oct 2015.
- (5) Air Force Research Labs, Wright Patterson Air Force Base, OH, Mar 2015.
- (4) 15th International Conference on Numerical Combustion, Avignon, France, Apr 2015.
- (3) National Wind Resource Center, Lubbock, Texas, Sep 2013.
- (2) NASA Langley Research Center, Langley, Virginia, July 2013.

(1) Extreme Engineering - Opportunities Using Petaflop Computing, Science and Technology Facilities Council, Daresbury Laboratories, Daresbury, UK, July 2008.