NASA 2022 Symposium on Turbulence Modeling: Roadblocks, and the Potential for Machine Learning
(Held in honor of Philippe R. Spalart's contributions to the turbulence modeling field)
Agenda V17

			Participant Talks
Wed July 27			
7:30 - 7:45 am	Registration & refreshment/food payments		
7:45 - 8:00 am			
8:00 - 8:15 am			
8:15 - 8:30 am			
8:30 - 8:45 am	Welcome, Intro, Overview	1 hr	
8:45 - 9:00 am			
9:00 - 9:15 am	Bookend talk 1 - **SPALART**		
9:15 - 9:30 am	An Old-Fashioned Framework for Machine Learning in Turbulence Modeling		
9:30 - 9:45 am	Break		
9:45 - 10:00 am	**Knopp, T.**: A data-driven wall law for the mean velocity in adverse-pressure gradient and modification of the SSG/LRR-w model	1.75 hrs	RANS related
10:00 - 10:15 am	**Abe, H.**: Improvement on the AMM model for predicting wing-body juncture flows		
10:15 - 10:30 am	**Agarwal, R.**: Review and Potential of Wray-Agarwal Family of Turbulence and Transition Models for RANS Simulations		
10:30 - 10:45 am	**Fritsch, D.**: Measurement and Modeling of Non-Equilibrium Turbulent Boundary Layer Flows		
10:45 - 11:00 am	**Lowe, T.**: Benchmark Turbulence Modeling Validation Experiments for Three-Dimensional Flows with Separation		
11:00 - 11:15 am	Discussion		
11:15 - 11:30 am			
11:30 - 11:45 am	Lunch		
11:45 - 12:00 noon			
12:00 - 12:15 pm			
12:15 - 12:30 pm			
12:30 - 12:45 pm			
12:45 - 1:00 pm	Invited Talk - **HUANG**	2 hrs	
1:00 - 1:15 pm	The Anchor Points of Turbulence Modeling		
1:15 - 1:30 pm			
1:30 - 1:45 pm	Panel Discussion - RANS		
1:45 - 2:00 pm	**Batten, Durbin, Hirsch, Smith**		
2:00 - 2:15 pm	(Moderator: **Spalart**)		
2:15 - 2:30 pm			
2:30 -2:45 pm			
2:45 -3:00 pm	Break		
3:00 - 3:15 pm	Intro to Challenge Case (**Rumsey**)	1.75 hrs	
3:15 - 3:30 pm	**Stoellinger, M.** (talk+Challenge): V&V of DES using multiple CFD codes		Talks including ML Challenge
3:30 - 3:45 pm			
3:45 - 4:00 pm	**Cherroud, S.** (talk+Challenge): Local Bayesian Mixing of Stochastic Explicit Algebraic Reynolds Stress Models		
4:00 - 4:15 pm			
4:15 - 4:30 pm	Discussion/Day 1 wrapup		
4:40 - 4:45 pm			
4:45 - 5:00 pm			
7:00 PM	NO-HOST DINNER		
Thu July 28			
8:00 - 8:15 am	Announcements, Coffee		
8:15 - 8:30 am			
8:30 - 8:45 am	Invited Talk - **SANDBERG**	1.5 hrs	
8:45 - 9:00 am	Evolution of Gene Expression Programming for Turbulence Modelling		
9:00 - 9:15 am			
9:15 - 9:30 am	**Fang, Y.** (Challenge): Towards more accurate and general turbulence models using CFD-driven training on multiple flows		Talks including ML challenge
9:30 - 9:45 am	**Parish, E.** (talk+Challenge): A data-driven turbulence modeling framework for the Reynolds-averaged Navier-Stokes equations via discrepancy-based tensor-basis neural networks		
9:45 - 10:00 am			
10:00 - 10:15 am	Break		
10:15 - 10:30 am	**Bin, Y. and Li, J.** (talk+Challenge): Progressive, extrapolative machine learning in turbulence modeling	1.5 hrs	Talks including ML challenge
10:30 - 10:45 am			
10:45 - 11:00 am	**Viswanathan, V.** (talk+Challenge): Differentiable Physics for Turbulence Modeling		
11:00 - 11:15 am			

11:15 - 11:30 am	**Marepally, K.** (Challenge): Field-Inversion Machine Learning Approach for Improved Turbulence and Transition Predictions of Flows Over Airfoils		
11:30 - 11:45 am	**Dwight, R.** (Challenge): SpaRTA with classification		
11:45 - 12:00 noon	**Lunch**		
12:00 - 12:15 pm			
12:15 - 12:30 pm			
12:30 - 12:45 pm			
12:45 - 1:00 pm			
1:00 - 1:15 pm	**Discussion of Challenge**	1 hr	
1:15 - 1:30 pm			
1:30 - 1:45 pm			
1:45 - 2:00 pm			
2:00 - 2:15 pm	Break		
2:15 - 2:30 pm	Invited Talk - **HIRSCH**	0.75 hrs	
2:30 - 2:45 pm	The HiFi-TURB EU project: vision and progress of ML-based turbulence modeling		
2:45 - 3:00 pm			
3:00 - 3:15 pm	Break		
3:15 - 3:30 pm	**Srivastava, V.**: Developing hierarchical augmentations via the Learning and Inference assisted by Feature-space Engineering (LIFE) framework	1.25 hrs	ML
3:30 - 3:45 pm	**Orkwis, P.:** Using LES/DNS data for Neural Network-based Improvement of Existing Turbulence Models		
3:45 - 4:00 pm	**Romano, J.:** Towards use of convolutional neural networks as a post processing enhancement to RANS modeled turbulence		
4:00 - 4:15 pm	**Discussion/Day 2 wrapup**		
4:15 - 4:30 pm			
4:30 - 4:45 pm			
4:45 - 5:00 pm			

Fri July 29

8:00 - 8:15 am	Announcements, Coffee		
8:15 - 8:30 am			
8:30 - 8:45am	**Eisfeld, B.** (presented by **Knopp**): Potential of Data Driven Methods for Reynolds Stress Modeling - A Fundamental View	1.5 hrs	ML
8:45 - 9:00 am	**Girimaji, S.**: Machine Learning, Scale Resolving Simulations and the Future of Predictive Computations of Engineering Flows		
9:00 - 9:15 am	**Miller, N.**: Data-Driven Calibration of RANS Closure Models with PIV		
9:15 - 9:30 am	**Evans, J.**: Data-Driven Construction of Iterative Algebraic Reynolds Stress Models using Model-Derived Turbulence Variables		
9:30 - 9:45 am	**Banko, A.**: Lessons from data-driven Reynolds stress and turbulent scalar flux closures: the roles of anisotropy, auxiliary turbulence equations, and model extrapolation		
9:45 - 10:00 am	**Volpiani, P.**: Improvement of RANS models by machine learning for a bump configuration		
10:00 - 10:15 am	Break		
10:15 - 10:30 am	Panel Discussion - MACHINE LEARNING	1.5 hrs	
10:30 - 10:45 am	**Banko, Cinnella, Dwight, Girimaji, Moser**		
10:45 - 11:00 am	(Moderator: **Duraisamy**)		
11:00 - 11:15 am			
11:15 - 11:30 am			
11:30 - 11:45 am			
11:45 - 12:00 noon	Lunch		
12:00 - 12:15 pm			
12:15 - 12:30 pm			
12:30 - 12:45 pm			
12:45 - 1:00 pm			
1:00 - 1:15 pm	Bookend talk 2 - **SPALART**	1 hr	
1:15 - 1:30 pm	Conjectures of a Generalized Law of the Wall and a Structural Limitation for Classical Turbulence Models		
1:30 - 1:45 pm	Discussion		
1:45 - 2:00 pm			
2:00 - 2:15 pm	Break		
2:15 - 2:30 pm	**Coder, J.**: Current Status of PDE-Based Transition Modeling for Aerodynamics Applications	1.75 hrs	Transition
2:30 -2:45 pm	**Durbin, P.**: Hybrid closure modeling with laminar to turbulent transition		
2:45 -3:00 pm	**Jee, S.**: High-fidelity computational data of transitional boundary layers for a data-driven approach		
3:00 - 3:15 pm	Panel Discussion - TRANSITION		
3:15 - 3:30 pm	**Xiao, Duraisamy**		
3:30 - 3:45 pm	(Moderator: **Durbin**)		
3:45 - 4:00 pm			
4:00 - 4:15 pm	Break		
4:15 - 4:30 pm	Final Discussion & Wrapup	0.5 hr	
4:40 - 4:45 pm			
4:45 - 5:00 pm			