



Karlsruhe Institute of Technology

International workshop on data-driven  
modeling and optimization in fluid mechanics

## Programme



### Monday 16.09.19

9:00 -10:00 Registration  
10:00 -10:15 Welcome address

#### Session 1 (Chair: Yosuke Hasegawa)

10:15 - 11:00 *Shape optimization for aerodynamic design*  
V. Schulz, Universität Trier

11:00 - 11:45 *Data assimilation using cross-analysis on experiments and CFD for car aerodynamics optimization*  
I. Mortazavi, CNAM Paris and S. Edwige, Plastic Omnium

11:45 - 13:45 Lunch break

#### Session 2 (Chair: Bettina Frohnäpfel)

13:45 - 14:30 *Machine learning for fluid mechanics modeling and control*  
P. Koumoutsakos, ETH Zürich

14:30 - 15:15 *Data-driven wall turbulence: UQ and structures*  
P. Schlatter, KTH Stockholm

15:15 - 16:00 *Turbulence control - better, faster and easier with machine learning*  
B. Noack, LIMSI, CNRS Universite Paris-Saclay

16:00 -16:30 Coffee break

#### Session 3 (Chair: Maurizio Quadrio)

16:30 - 17:15 *Reconstruction of turbulent velocity and scalar field based on limited measurements*  
Y. Hasegawa, University of Tokyo

17:15 - 18:00 *Gaussian process regression for heterogeneous measuring networks of environmental data*  
J. Riesterer, Karlsruhe Institute of Technology

20:00 Dinner at Vogelbräu Kapellenstraße 50, 76131 Karlsruhe  
(for invited speakers and participants registered for dinner)

## Tuesday 17.09.19

### Session 4 (Chair: Ricardo Vinuesa)

- 08:15 - 09:00 *Probabilistic modeling with machine learning methods*  
S. Lerch, Karlsruhe Institute of Technology
- 09:00 - 09:45 *Machine learning and fluid mechanics in biological applications*  
M. Quadrio, Politecnico di Milano
- 09:45 - 10:15 Coffee break

### Session 5 (Chair: Philipp Schlatter)

- 10:15 - 11:00 *Predictions in turbulent shear flows using deep neural networks*  
R. Vinuesa, KTH Stockholm
- 11:00 - 11:45 *Optimal mode decomposition-based approach to studying energy/scalar transfers in multi-scale generated turbulent flows*  
O. Buxton, Imperial College London
- 11:45 - 13:45 Lunch break

### Session 6 (Chair: TBA)

- 13:45 - 14:05 *CFD-based stent optimization in patient specific intracranial aneurysm*  
G. Janiga, Universität Magdeburg
- 14:05 - 14:25 *Artificial neural network Poisson solver:  
Learning the pressure projection step*  
M. Boden, ETH Zürich
- 14:25 - 14:45 *Recurrent neural networks and reservoir computers for  
spatiotemporal forecasting of chaotic dynamics*  
P. Vlachas, ETH Zürich
- 14:45 - 15:05 *Learning from CFD data - a dimensionality reduction problem*  
A. Schillaci, Politecnico Milano
- 15:05 - 15:25 *Active-learning models for fluid systems*  
L. Mason & G. Gonçaves, Imperial College London
- 15:25 - 15:45 *Convolutional neural networks for the solution of the 2D Poisson equation  
with arbitrary dirichlet boundary conditions, mesh sizes and grid spacings*  
A. G. Ozbay, Imperial College London