

Eurika Kaiser

Moore/Sloan and WRF Innovation in Data Science Postdoctoral Fellow
eScience Institute, University of Washington

<http://eurika-kaiser.com>

Research interests

- Nonlinear dynamical systems, statistical physics
- Data science: Dimensionality reduction, cluster analysis, sparse sampling, compressed sensing
- Model reduction, system identification, equation-free modeling for high-dimensional dynamical systems
- Stochastic and optimal control, statistical learning, machine learning for control design and optimization
- Fluid dynamics: shear flows, flow sensing, flow control

Academic Positions

University of Washington

eScience Institute, Mechanical Engineering, Applied Mathematics

03/2016–until now

Moore/Sloan and WRF Data Science Postdoctoral Fellow / Research Associate

Seattle, USA

Advisors: Steven L. Brunton & J. Nathan Kutz

Education

Université de Poitiers

2012–2015

Ph.D. in modeling and control of turbulent flows

Poitiers, France

Advisors: Bernd R. Noack & Andreas Spohn

Thesis title: Low-dimensional modeling and control of shear flows using cluster analysis

Technische Universität Berlin

2005–2012

Master of Science (Dipl.-Ing.)

Berlin, Germany

Studies of Physical Engineering, specialized in fluid dynamics and acoustics

Advisors: Michael Schlegel, Jörn Sesterhenn

Thesis title: Coherent flow dynamics of the turbulent mixing layer

Awards & Honors

- Gordon and Betty Moore Foundation, Alfred P. Sloan Foundation and Washington Research Foundation Innovation in Data Science Postdoctoral Fellowship sponsoring 2 years and \$25,000 travel expenses, eScience Institute, University of Washington (2016)
- Scholarship by the region Poitou-Charentes, France, to attend the PhD program at Université de Poitiers (2012)

Research stays

Florida State University, FCAAP/AME Research Center

08/2014–08/2015

Advisors: Louis N. Cattafesta III. & Farrukh Alvi

Publications

Book Chapters

- [1] Bai, Z., Brunton, S. L., Brunton, B. W., Kutz, J. N., **Kaiser, E.**, Spohn, A. & Noack, B. R. (2016) "Data-driven methods in fluid dynamics: Sparse classification from experimental data." In *Whither Turbulence and Big data in the 21st Century*, Springer.

Journal Articles

- [1] **Kaiser, E.**, Morzyński, M., Daviller, G., Kutz, J. N., Brunton, B. W. and Brunton, S. L. (2017) "Sparsity enabled cluster reduced-order models for control," *Journal of Computational Physics*, 352:388–409.
- [2] Brunton, S. L., Brunton, B. W., Proctor, J. L., **Kaiser, E.** & Kutz, J. N. (2017) "Chaos as an intermittently forced linear system." *Nature Communications*, 8(19):1–9.
- [3] **Kaiser, E.**, Noack, B. R., Spohn, A., Cattafesta, L. N. and Morzyński, M. (2017) "Cluster-based control of a separating flow." Invited paper for (Eds. Vassilis Theofilis and Ati Sharma) "Special Issue on Global Flow Instability and Control." in *Theoretical and Computational Fluid Dynamics*, pp. 1–15.
- [4] Östh, J., **Kaiser, E.**, Krajnović, S. and Noack, B. R. (2015) "Cluster-based reduced-order modelling of the flow in the wake of a high speed train." Invited paper for the "Special Section on Aerodynamics of Road Vehicles and Trains. Edited by Sinisa Krajnovic, Iraj Mortazavi, Charles-Henri Bruneau." *Journal of Wind Engineering and Industrial Aerodynamics*, **145**, pp.327–338.
- [5] Cao, Y., **Kaiser, E.**, Borée, J., Noack, B. R., Thomas, L. & Guilan, S. (2014) "Cluster-based analysis of cycle-to-cycle variations: application to internal combustion engines." *Experiments in Fluids*, **55**:1837.
- [6] **Kaiser, E.**, Noack, B.R., Cordier, L., Spohn, A., Segond, M., Abel., M., Daviller, G., Östh, J., Krajnović, S. & Niven, R.K. (2014) "Cluster-based reduced-order modelling of a mixing layer". *Journal of Fluid Mechanics*, **754**, pp. 365–414.

Journal Articles under Review

- [1] Ishar, R., **Kaiser, E.**, Morzynski, M. and Noack, B. R. (2017) "Metric for attractor overlap". arXiv Preprint arXiv:1712.00717, under review in *Journal of Fluid Mechanics*.
- [2] **Kaiser, E.**, Kutz, J. N. and Brunton, S. L (2017) "Sparse identification of nonlinear dynamics for model predictive control in the low-data limit". arXiv Preprint arXiv:1711.05501.
- [3] Bai, Z., **Kaiser, E.**, Proctor, J. L., Kutz, J. N. and Brunton, S. L (2017) "Dynamic mode decomposition for compressive system identification". Submitted as an invited paper for a special issue in AIAA Journal. arXiv Preprint arXiv:1710.07737.
- [4] **Kaiser, E.**, Kutz, J. N. and Brunton, S. L (2017) "Discovery of Koopman eigenfunctions for control," arXiv:1707.01146, under review in *Automatica*.
- [5] Li, R., Noack, B. R., Cordier, L., Borée, J., **Kaiser, E.** and Harambat, F. (2017) "Linear genetic programming control for strongly nonlinear dynamics with frequency crosstalk" under review in *Journal of Machine Learning Research*.
- [6] Niven, R. K., Hérouard, N., Noack, B. R., **Kaiser, E.**, Cordier, L., Abel, M. W. and Schlegel, M. (2016) "Reynolds Averaging and Spatial Analogues of the Liouville Equation" submitted.

Journal Articles in Preparation

- [1] Manohar, K., **Kaiser, E.**, Brunton, S. L and Kutz, J. N. (2017) "Sensor placement for multi-scale phenomena". To be submitted by December 15th.

Conference Papers

- [1] Loosen, S., **Kaiser, E.**, Noack, B. R. and Schröder, W. (2017) "Cluster-based reduced-order modeling of the transonic wake of a generic space launcher configuration" Sonderforschungsbereich/Transregio 40, *Proceedings of the Summer Program 2017*.
- [2] Ferrari, S., Hu, Y., Martinuzzi, R. J., **Kaiser, E.**, Noack, B. R., Östh, J. & Krajnović, S. "Visualizing Vortex Clusters in the Wake of a High-Speed Train." Paper to be presented at the *2017 IEEE International Conference on Systems, Man, and Cybernetics (SMC2017)*, Banff, Canada, 5–8 October, 2017.
- [3] **Kaiser, E.**, Li, R. and Noack, B. R. "On the control landscape topology." Extended abstract presented at the *The 20th World Congress of the International Federation of Automatic Control (IFAC17)*, Toulouse, France, 9–14 July, 2017.
- [4] Niven, R.K., **Kaiser, E.**, Noack, B. R., Cattafesta, L.N., Abel, M.W. & Cordier, L. "Rapid Bayesian Dynamical Models From Fluid Flow Data." *Proceedings of the 20th Australasian Fluid Mechanics Conference (AFMC)*, The University of Western Australia, Perth, Australia, 5–8 December, 2016.
- [5] Niven, R.K., Noack, B. R., **Kaiser, E.**, Cattafesta, L.N., Cordier, L. & Abel, M.W. "Bayesian cyclic networks, mutual information and reduced-order Bayesian inference." (2016) *AIP Conference Proceedings* 1757(1):020008. Invited submitted manuscript to *35th International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering*, Clarkson University, NY, USA, 19–24 July, 2015.
- [6] **Kaiser, E.**, Noack, B. R., Cordier, L., Spohn, A., Segond, M., Abel, M., Daviller, G., Morzyński, M., Östh, J., Krajnović, S. & Niven, R. K. "Cluster-based reduced-order modelling of shear flows." (2014) *AIP Conf. Proc.* **1636**(151), 151–158. Chapter in the book NIVEN, R. K, BREWER, B., PAULL, D. , SHAFI, K. & STOKES, B. (ED.), *Bayesian Inference and Maximum Entropy Methods in Science and Engineering*. AIP Publishing, Melville, New York.
- [7] Berger, Z. P., Berry, M. G., Shea, P., Glauser, M., Jiang, N., Goginemi, S., **Kaiser, E.**, Noack, B.R. & Spohn, A. "Analysis of High Speed Jet Flow Physics with Time-Resolved PIV." (2014) Technical Paper presented at the *52nd Aerospace Sciences Meeting, AIAA SciTech Forum*, 13–17 Jan 2014, National Harbor, MD, USA.
- [8] **Kaiser, E.**, Spohn, A., Cordier, L. & Noack, B.R. "Local forcing of laminar separation bubbles." (2013) Paper in the *Proceedings of the 8th International Symposium On Turbulent and Shear Flow Phenomena (TSFP-8)* (editors: Bonnet, J.-P., Sung, H.J., Vervisch, L. & Hanjalic, K.), 28-30 Aug. 2013, Poitiers, France.

Talks

Invited Talks (EK invited)

- [1] **Kaiser, E.** "Data-driven methods for the modeling and control of nonlinear dynamical systems." Mathematics & Statistics Seminar at University of New South Wales, Sydney, Australia, 14 November 2017.
- [2] **Kaiser, E.** "Modeling and control of nonlinear dynamical systems from data" *United Technologies Research Center (UTRC)*, Hartford, CT, 1st November 2017.
- [3] **Kaiser, E.**, Loosen, S., Noack, B. R. & Schröder, W. "Cluster-based reduced-order modeling of transonic wakes of generic space launcher configurations." *SFB TRR40 Summer Program Garching*, Garching bei Munich, Germany, 11 and 25 August 2017.

- [4] **Kaiser, E.** "Discovery of low-dimensional models from data." Seminar in the group of Prof. Torsten Enßlin at the Max-Planck Institute for Astrophysics, Garching, Germany, 16 August 2017.
- [5] **Kaiser, E.** "Modeling, control and sensor placement in the CROM framework." *2nd Workshop Machine Learning Control (wMLC-2)*, Valenciennes, France, 5–6 July 2017.
- [6] **Kaiser, E.**, Brunton, S. L., Brunton, B. W., Noack, B. R., Cattafesta, L.N. & Morzyński, M. "Data-driven modeling, control and sensor placement using cluster analysis." In the session "*Modal Decomposition: Applications and New Approaches*" at the *AIAA Aviation and Aeronautics Forum and Exposition, 2017*, Denver, USA, 5–9 June 2017.
- [7] **Kaiser, E.** "Sparsity Enabled Cluster Reduced-Order Models." Workshop *Classical and Geophysical Fluid Dynamics: Modeling, Reduction and Simulation*, Department of Mathematics, Virginia Tech, USA, 26–28 June 2017.
- [8] **Kaiser, E.**, Noack, B. R., Spohn, A., Niven, R. K., Cattafesta, L. N., Morzyński, M., Brunton, S. L., Brunton B. W. & Kutz, J. N. "Data-Driven Techniques for Modeling, Control and Sensor Placement." *SIAM Conference on Dynamical Systems (DS17)*, Snowbird, Utah, USA, 21 – 25 May 2017.
- [9] **Kaiser, E.** "Modeling and control of fluid flows using cluster-based reduced-order models", Seminar talk in the Daniel Lab (group led by Tom Daniel), Biology Department, University of Washington, USA, 28 April 2017.
- [10] **Kaiser, E.** "Modeling and control of fluid flows using cluster-based reduced-order models." Applied Mathematics Seminar at University of California, Santa Cruz, USA, 2 April 2017.
- [11] **Kaiser, E.** "Strategies for Modeling Nonlinear Mechanisms from Data." *SIAM Conference on Dynamical Systems (CSE17)*, Atlanta, Georgia, USA, February 27 – March 3 2017.
- [12] **Kaiser, E.** "Cluster-based Reduced-Order Modeling: From Shear Flows to Engine Tumble Motion." *DARPA Program "MoDyl" Kick-off Meeting*, Santa Barbara, USA, November 4 2016.
- [13] **Kaiser, E.** "Data-Driven Techniques for Modeling, Control and Sensor Placement." Seminar talk in the CAOS group at *Courant Institute, New York University*, 20 October 2016.
- [14] **Kaiser, E.**, Noack, B. R., Spohn, A., Cordier, L., Abel, M., Niven, R. K. & Cattafesta, L. N. "Cluster-based Reduced-Order Modeling and Control of Nonlinear Dynamics." *SIAM Annual Meeting (AN16)*, Boston, USA, 11 – 15 July 2016.
- [15] **Kaiser, E.**, Noack, B. R., Cordier, L., Spohn, A., Segond, M., Abel, M. W., Daviller, G., Niven, R. K., Cattafesta, L. N. & Morzyński, M. "Low-dimensional modeling and control of shear flows using cluster analysis." *SIAM Conference on Uncertainty Quantification (UQ16)*, Lausanne, Switzerland, 5 – 8 April 2016.
- [16] **Kaiser, E.** "How can we aid the development and benchmarking of new control strategies?" *First Workshop on Machine Learning Control (wMLC-1)*, LIMSI, Orsay, France, 16 – 17 February 2016.
- [17] **Kaiser, E.** with Noack, B. R., Cordier, L., Spohn, A., Segond, M., Abel., M., Daviller, G., Östh, J., Krajnović, S., Cao, Y., Boree, J., Thomas, L., Guilain, S., Cattafesta, L. N., Niven, R.K. & Morzyński, M. "Low-dimensional modeling and control of shear flows using cluster analysis." *Symposium Experiments in Fluid Mechanics – EFM 2015*, Institute of Aeronautics and Applied Mechanics, Warsaw, Poland, 26–27 October 2015 (Plenary talk).
- [18] **Kaiser, E.** with Noack, B. R., Cordier, L., Spohn, A., Segond, M., Abel., M., Daviller, G., Östh, J., Krajnović, S., Cao, Y., Boree, J., Thomas, L., Guilain, S., Niven, R.K. & Cattafesta, L. N. "Feature extraction and low-dimensional modelling of unsteady flows using cluster analysis." Boeing Advanced Research Center, University of Washington, Seattle, USA, 3 June 2015.

- [19] **Kaiser, E.** with Noack, B. R., Cordier, L., Spohn, A., Segond, M., Abel, M., Daviller, G., Östh, J., Krajnović, S., Cao, Y., Boree, J., Niven, R.K. & Cattafesta, L. N. "Cluster-based reduced-order modelling – From shear flows to engine tumble motion." *SIAM Conference on Computational Science & Engineering (CSE15)*, Salt Lake City, USA, 14-18 March 2015.
- [20] **Kaiser, E.**, Noack, B. R. (presenter), Cordier, L., Spohn, A., Segond, M., Abel, M., Niven, R. K. Daviller, G., Östh, J., Krajnović, S., Cao, Y., Borée, J., Thomas, L. & Guillain, S. "Cluster-based reduced-order modelling (CROM) of shear flows." Workshop Aristote, *Reduced Order of Complexity & Reduced Order of Model (ROC & ROM)*, École Polytechnique, Palaiseau, France, 23 October 2014.
- [21] **Kaiser, E.** with Noack, B. R., Cordier, L., Spohn, A., Segond, M., Abel, M.W., Daviller, G., Östh, J., Krajnović, S., Cao, Y., Borée, J & Niven, R.K. "Cluster-based reduced-order modelling." FCAAP/AME Research Center, Florida State University, Tallahassee, USA, 16 October 2014.
- [22] **Kaiser, E.** with Noack, B. R., Cordier, L., Spohn, A., Segond, M., Abel, M.W., Daviller, G., Östh, J., Krajnović, S., Cao, Y., Borée, J & Niven, R.K. "Cluster-based reduced-order modelling," Computational Fluid Dynamics Lab (Kunihiko Taira), Florida State University, Tallahassee, USA, 8 September 2014.
- [23] **Kaiser, E.** with Noack, B. R., Cordier, L., Spohn, A., Segond, M., Abel, M., Daviller, G. & Niven, R. K. "Cluster-based reduced-order modelling of a mixing layer" *2nd International Forum for Turbulence and Network Control (IFTNC-2 2013)*, Ambrosys GmbH, Potsdam, Germany, 2–29 September 2013.
- [24] **Kaiser, E.** with Noack, B. R., Spohn, A., & Morzyński, M., "DNS of a separating flow over a smooth ramp." Progress meeting of the ANR project 'SepaCoDe', Lille, France, 19 March 2013.
- [25] **Kaiser, E.**, Noack, B. R., Spohn, A. "Closed-loop control of a separating flow over a smooth ramp." *International Forum for Turbulence and Network Control (IFTNC 2013)*, Ambrosys GmbH, Potsdam, Germany, 4–14 February 2013.

Invited Talks (Others invited)

- [1] Manohar, K., **Kaiser, E.**, Brunton, S. L. & Kutz, J. N. "Sparse Sensor Placement for Multiscale Phenomena." *SIAM Conference on Dynamical Systems (DS17)*, Snowbird, Utah, USA, 21 – 25 May 2017.
- [2] Brunton, S, Brunton, B, Proctor, J., **Kaiser, E.** & Kutz, J. N. "Hankel Alternative View Of Koopman (Havok) Analysis of Chaotic Systems." *SIAM Conference on Dynamical Systems (DS17)*, Snowbird, Utah, USA, 21 – 25 May 2017.
- [3] Chovet, C., Keirsbulck, L., **Kaiser, E.** & Noack, B. R. "Active flow control on a back facing step configuration." Meeting of the *GDR 2502 'Flow Separation Control'*, LMFA, École Centrale de Lyon, Écully, France, 28 – 29 November 2016.
- [4] Niven, R. K., Noack, B. R., **Kaiser, E.**, Cordier, L., Cattafesta, L. N. & Abel, M. W. "Rapid Bayesian Inference on Bayesian Cyclic Networks." *SIAM Conference on Uncertainty Quantification (UQ16)*, Lausanne, Switzerland, 5 – 8 April 2016.
- [5] Niven, R. K., Noack, B. R., **Kaiser, E.**, Cattafesta, L. N., Cordier, L. & Abel, M. "Bayesian Cyclic Networks, Mutual Information and Reduced-Order Bayesian Inference." Laboratoire des signaux et systèmes, CNRS-Centrale Supélec-Univ Paris Sud, Paris, France, 17 July 2015.
- [6] Noack, B. R. & **Kaiser, E.** "Machine Learning Modeling: Low-dimensional modeling and control of nonlinear dynamics using cluster analysis." *Summer School "Nonlinear Dynamics"*, Peyresq, France, 27 August 2015.

- [7] Noack, B. R., Duriez, T., Parezanović, V., von Krbek, K., **Kaiser, E.**, Cordier, L., Bonnet, J.-P., Segond, M., Abel, M. W., Gautier, N., Aider, J.-L., Raibaud, C., Cuvier, C., Stanislas, M., Debien, A., Mazellier, N., Kourta, A. & Brunton, S. & Niven & R. K. "Closed-loop turbulence control using machine learning." Meeting of the *GDR 2502 Flow Separation Control and GDR MOSAR*, LIMSI, Orsay, France, 17–18 November 2014 (Plenary talk).
- [8] Parezanović, V., **Kaiser, E.**, Spohn, A., Cordier, L. & Noack, B. R. "Separation control using optical feedback." Meeting at the *GDR 2502 Flow Separation Control and GDR MOSAR*, LIMSI, Orsay, 17–18 November 2014.
- [9] Noack, B.R. with **Kaiser, E.**, Duriez, T., Cordier, L., Spohn, A., Parezanovic, V., Delville, J., Bonnet, J.-P., Segond, M., Abel, M.W., Daviller, G., Brunton, S., & Niven, R.K. "Turbulence modelling and control using entropy principles." Bayesian Forum, Max-Planck-Institut für Astrophysik, Munich-Garching, Germany, 27 February 2014.
- [10] Noack, B. R., Duriez, T., Parezanovic, V., Laurentie, J.-C., Schlegel, M., **Kaiser, E.**, Cordier, L., Spohn, A., Bonnet, J.-P., Morzyński, M., Segond, M., Abel, M. W. & Brunton, S. "Closed-loop turbulence control – A systematic strategy for the nonlinearities." *SIAM Conference on Uncertainty Quantification (UQ14)*, Savannah, Georgia, USA, 31 March – 3 April 2014.
- [11] Noack, B.R., Parezanovic, V. & **Kaiser, E.** (joint seminar between the 3 authors) with Cordier, L., Duriez, T., Delville, J., Bonnet, J.-P., Segond, M., Abel, M., Morzynski, M. & Brunton, S., "Closed-loop turbulence control - modelling and exploiting the nonlinearities." Seminar of LadHyX, Palaiseu, France, 13 February 2014.
- [12] Noack, B. R., **Kaiser, E.**, Duriez, T., Cordier, L., Laurentie, J.-C., Parezanovic, V., Spohn, A., Bonnet, J.- P., Segond, M., Abel, M.W., Daviller, G. & Niven, R.K. "Turbulence modelling and control using entropy principles." *33rd International Workshop on Bayesian Inference and Maximum Entropy Methods in Science and Engineering (MaxEnt 2013)*, Canberra, NSW, Australia, 15-20 Dec. 2013 (Keynote talk).
- [13] Noack, B.R., Parezanovic, V. & **Kaiser, E.** (joint seminar between the 3 authors) with Duriez, T., Cordier, L., Delville, Spohn, A., J., Bonnet, J.-P., Noack, B.R., Segond, M., Abel, M. & Brunton, S. "Closed-loop turbulence control - Modelling and exploiting the nonlinearities." Séminaire de Meca-Flu, ONERA, Meudon, France, 5 December 2013.
- [14] Noack, B.R., Duriez, T. & **Kaiser, E.** (joint seminar between the 3 authors) with Parezanovic, V., Cordier, L., Delville, J., Bonnet, J.-P., Segond, M., Abel, M. & Brunton, S., "Closed-loop turbulence control - Modelling and exploiting the nonlinearities." Séminaire de Mécanique d'Orsay, LIMSI, Orsay, France, 24 October 2013.
- [15] Noack, B.R., **Kaiser, E.** & Duriez, T. (joint seminar between the 3 authors) with Parezanovic, V., Cordier, L., Delville, J., Bonnet, J.-P., Spohn, A., Segond, M., Abel, M. & Brunton, S. "Closed-loop turbulence control - Modelling and exploiting the nonlinearities." Seminar of the Sfb 880, Institute of Fluid Mechanics, Technical University of Braunschweig, Braunschweig, Germany, 20 September 2013.

Contributed Talks

- [1] Brunton, S. L., **Kaiser, E.**, Kutz, J. N. "Koopman operator theory: Past, present, and future." To be presented at the *70th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society* Denver, CO, USA, November 19–21 2017.
- [2] **Kaiser, E.**, Kutz, J. N. & Brunton, S. L. "Data-driven discovery of Koopman eigenfunctions for control." To be presented at the *70th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society* Denver, CO, USA, November 19–21 2017.
- [3] Manohar, K., **Kaiser, E.**, Brunton, S. L. & Kutz, J. N. "Data-driven sensor placement from coherent fluid structures." To be presented at the *70th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society* Denver, CO, USA, November 19–21 2017.

- [4] Bai, Z., **Kaiser, E.**, Proctor, J., Kutz, J. N. & Brunton, S. L. “Dynamic mode decomposition for compressive system identification.” To be presented at the *70th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society* Denver, CO, USA, November 19–21 2017.
- [5] **Kaiser, E.**, Morzyński, M., Daviller, G., Kutz, J. N., Brunton, B. W. & Brunton, S. L. “Sparsity-enabled cluster-based reduced-order models (CROM) for control.” Summer school and workshop *Data-driven methods for Multi-Scale Physics and Complex Systems* (Org. J. N. Kutz, S. L. Brunton, C. Conti & E. del Rey), Rome, Italy, July 24 – August 4 2017.
- [6] **Kaiser, E.**, Noack, B.R., Spohn, A., Cattafesta, L. N., Morzyński, M., Daviller, G., Niven, R.K., Brunton, S. L., Brunton, B. W. & Kutz, J. N. “A probabilistic approach to modeling and controlling fluid flows.” *69th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society* (Bulletin Am. Phys. Soc. Vol. **61**, No. 20, E10.00006), Portland, OR, USA, November 20-22 2016.
- [7] Manohar, K., **Kaiser, E.**, Brunton, S. L. & Kutz, J. N. “Sensor Placement in Multiscale Phenomena using Multi-Resolution Dynamic Mode Decomposition.” *69th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society* (Bulletin Am. Phys. Soc. Vol. **61**, No. 20, L8.00008), Portland, OR, USA, November 20-22 2016.
- [8] Bai, Z., **Kaiser, E.**, Proctor, J., Kutz, J. N. & Brunton, S. L. “Compressed sensing DMD with control.” *69th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society* (Bulletin Am. Phys. Soc. Vol. **61**, No. 20, L8.00009), Portland, OR, USA, November 20-22 2016.
- [9] Niven, R. K., **Kaiser, E.**, Noack, B. R., Cattafesta, L. N., Abel, M. & Cordier, L. “Rapid Bayesian Inference for Fluid Flow Modeling and Control.” *69th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society* (Bulletin Am. Phys. Soc. Vol. **61**, No. 20, D34.00008), Portland, OR, USA, November 20-22 2016.
- [10] Cao, Y., **Kaiser, E.**, Boree, J., Noack, B. R., Thomas, L. & Guilain, S. “Cluster-based reduced-order modelling of a gasoline IC engine.” *LES4ICE - LES for Internal Combustion Engine Flows*. IFP Energies nouvelles, France, 4–5 December 2014.
- [11] Östh, J., **Kaiser, E.**, Krajnović, S., Noack, B. “The dynamics of the flow in the wake of a generic high-speed train studies by Large Eddy Simulation and Cluster-based Reduced-Order Modelling.” *First International Conference in Numerical and Experimental Aerodynamics of Road Vehicles and Trains (Aerovehicles 1)*, IFP Energies nouvelles, France, 23–25 June 2014.
- [12] **Kaiser, E.**, Noack, B.R., Cordier, L., Spohn, A., Segond, M., Abel., M., Daviller, G. & Niven, R.K. “Cluster-based reduced-order modelling of a mixing layer.” *66th Annual Meeting of the Division of Fluid Dynamics of the American Physical Society* (Bulletin Am. Phys. Soc. Vol. **58**, No. 18, H35.00010, p.312), Pittsburgh, PA, USA, November 2013.

Organized Seminars and Symposia

SIAM Annual Meeting 2018 Minisymposium
Data-driven modeling and control of complex systems
 Co-Organizer, with Aditya Nair

SIAM Uncertainty Quantification 2018 Minisymposium
Data-driven discovery for dynamical systems
 Co-Organizer, with Travis Askham

SIAM Dynamical Systems 2017 Minisymposium
Multiscale Dynamics: Data-driven characterization, modeling, and control
 Co-Organizer, with Krithika Manohar

SIAM Computational Science and Engineering 2017 Minisymposium
Data-driven characterization, control, and uncertainty quantification of dynamical systems
 Co-Organizer, with Travis Askham

Department seminar at Mech. Eng. and Appl. Math, University of Washington, November 2016
Organizer

Department seminar at FCAAP, Florida State University, December 2014
Organizer

Teaching

Instructor, University of Washington

- **ME564: Mechanical Engineering Analysis**, Fall 2017, 150 graduate students enrolled
Co-teaching w/ Prof. Steven Brunton
- **ME599: Machine Learning Control**, Spring 2017, 30 graduate students enrolled
Co-taught and co-designed w/ Prof. Steven Brunton

Teaching Assistant, Technical University Berlin

- **Control design and model reduction for fluid dynamics**, Spring 2012
Instructor: Dr. Michael Schlegel

Service

Professional Societies: SIAM, APS, AAAS

Review papers: Science Advances, Europ. J. Mech. / B Fluids, IFAC, ACC, AIAA

Session chair at conferences: APS DFD (2016), SIAM CSE (2017), SIAM DS (2017)

Committees: Education Committee at the eScience Institute, UW