

Kai Zhang

Associate Professor (Tenure Track)
Department of Civil Engineering
Shanghai Jiao Tong University, Shanghai, 200240

E-mail: kai.zhang@sjtu.edu.cn
Personal Website: [\[link\]](#)
Google Scholar: [\[link\]](#)

Updated: June 22, 2022

Research Interests

- Bluff Body Aerodynamics
- Computational Fluid Dynamics
- Flow Control
- Reduced-Order Modeling
- Data-driven Analysis
- Linear stability Analysis

Education

Yokohama National University, Yokohama, Japan
Doctor of Engineering, Civil Engineering, 2014 – 2017

Yokohama National University, Yokohama, Japan
M.S., Civil Engineering, 2012 – 2014

Shanghai Jiao Tong University, Shanghai, China
M.S. candidate, Civil Engineering, 2011 – 2012

Xi'an Jiao Tong University, Xi'an, China
B.S., Civil Engineering, 2011 – 2012

Appointments

Shanghai Jiao Tong University, Shanghai, China

- Associate Professor, 2022/02 – present
School of Naval Architecture, Ocean and Civil Engineering

Rutgers, The State University of New Jersey, New Brunswick, NJ, USA

- Postdoctoral Associate, 2020/03 – 2022/01
Department of Mechanical and Aerospace Engineering

University of California, Los Angeles, CA, USA

- Postdoctoral Associate, 2019/01 – 2020/02
Department of Mechanical and Aerospace Engineering

Florida State University, Tallahassee, FL, USA

- Postdoctoral Research Associate, 2017/11 – 2018/12
Department of Aerospace and Mechanical Engineering

Academic Services & Memberships

- **Journal Referee**
 - AIAA Journal
 - Theoretical and Computational Fluid Dynamics
 - Physics of Fluids
 - Journal of Nuclear Science and Technology
 - Journal of Fluids Engineering
 - China Ocean Engineering
 - Fluids

Publications

Journal Articles (* corresponding author)

In Preparation

- 33. **Zhang, K.*** (2021) End boundary effects on inclined cylinder wakes.
- 32. **Zhang, K.** & Du, X. (2021) Large eddy simulations of flows over two side-by-side circular cylinders of small size difference.
- 31. **Zhang, K.** Modes of interaction in the wake of a circular cylinder oscillating in an arbitrary direction.
- 30. **Zhang, K.** Wake dynamics of two side-by-side uneven circular cylinders undergoing forced vibration.
- 29. **Zhang, K.** Scrutinizing the “cosine rule” of flow over an inclined circular cylinder at low Reynolds numbers.

In Review

- 28. Marques Ribeiro, J. H., Yeh, C.-A., **Zhang, K.** & Taira, K. Wing sweep effect on laminar separated flows. In revision in *Journal of Fluid Mechanics*.

2022

- 27. **Zhang, K.*** & Haque, N. (2022) Wake interactions between two side-by-side circular cylinders of uneven size. *Physical Review Fluids*, accepted.
- 26. Burtsev, A., He, W., Hayostek, S., **Zhang, K.**, Theofilis, V., Taira, K. & Amitay, M. (2022) Linear modal instabilities around post-stall swept finite aspect ratio wings at low Reynolds numbers. *Journal of Fluid Mechanics*, 944, A6.
- 25. **Zhang, K.***, Taira, K. (2022) Laminar vortex dynamics around forward-swept wings. *Physical Review Fluids*, 7, 024704.
- 24. **Zhang, K.***, Shah, B. and Bilgen, O. (2022) Low-Reynolds-number aerodynamic characteristics of airfoils with piezocomposite trailing control surfaces. *AIAA Journal*, 1-6.
- 23. Kuang, L., Su, J., Chen, Y., Han, Z., Zhou, D., **Zhang, K.**, Zhao, Y. & Bao, Y. (2021). Wind-capture-accelerate device for performance improvement of vertical-axis wind turbines: External diffuser system. *Energy*, 239(B), 15, 122196.

2021

- 22. Morimoto, M., Fukami, K., **Zhang, K.** & Fukagata, K. (2021). Toward practical uses of neural networks for fluid flow estimation. *Neural Computing and Applications*, 1-23.
- 21. Ping, H., Zhu, H., **Zhang, K.**, Zhou, D., Bao, Y. & Han, Z. (2021). Vortex-induced vibrations of two rigidly coupled circular cylinders of unequal diameters at low Reynolds number. *Physics of Fluids*, 33, 103603.
- 20. Fukami, K., Murata, T., **Zhang, K.** & Fukagata, K. (2021). Sparse identification of nonlinear dynamics with low-dimensionalized flow representations. *Journal of Fluid Mechanics*, 926, A10.
- 19. Morimoto, M., Fukami, K., **Zhang, K.**, Nair, A. G. & Fukagata, K. (2021). Convolutional neural networks for fluid flow analysis: toward effective metamodeling and low-dimensionalization. *Theoretical and Computational Fluid Dynamics*, 35, 633–658.
- 18. Ping, H., Zhu, H., Zhang, K., Zhou, D., Bao, Y., Xu, Y. & Han, Z. (2021). Dynamic mode decomposition based analysis of flow past a transversely oscillating cylinder. *Physics of Fluids*, 33, 033604.
- 17. Zhang, Z., Tu, J., **Zhang, K.**, Yang, H., Han, Z., Zhou, D., Xu, J. & Zhang, M. (2021). Vortex characteristics and flow-induced forces of the wavy cylinder at a subcritical Reynolds number. *Ocean Engineering*, 222, 108593.
- 16. Chen, Y., Dong, Z., Wang, Y., Su, J., Zhou, D., **Zhang, K.**, Zhao, Y., Bao, Y. & Han, Z. (2021). Short-term wind speed predicting framework based on EEMD-GA-LSTM method under large scaled wind history. *Energy Conversion and Management*, 227, 113559.

2020

- 15. Ping, H., Zhu, H., **Zhang, K.**, Wang, R., Zhou, D., Bao, Y. & Han, Z. (2020). Wake dynamics behind a rotary oscillating cylinder analyzed with proper orthogonal decomposition. *Ocean Engineering*, 218, 108185.
- 14. **Zhang, K.***, Hayostek, S., Amitay, M., Burtsev, A., Theofilis, V. & Taira, K. (2020). Laminar separated flows over finite-aspect-ratio swept wings. *Journal of Fluid Mechanics*, 905, R1.
- 13. **Zhang, K.**, Zhou, D., Katsuchi, H., Yamada, H., Han, Z. & Bao, Y. (2020). Bistable states in the wake of a wavy cylinder. *Physics of Fluids*, 32(7), 074112.

12. **Zhang, K.***, Hayostek, S., Amitay, M., He, W., Theofilis, V. & Taira, K. (2020). On the formation of three-dimensional separated flows over wings under tip effects. *Journal of Fluid Mechanics*, 895, A9.
-
- 2018**
11. **Zhang, K.**, Katsuchi, H., Zhou, D., Yamada, H., Bao, Y., Han, Z. & Zhu, H. (2018). Numerical study of flow past a transversely oscillating wavy cylinder at $Re=5000$. *Ocean Engineering*, 169, 539-550.
 10. **Zhang, K.**, Katsuchi, H., Zhou, D., Yamada, H. & Lu, J. (2018). Large eddy simulation of flow over inclined wavy cylinders. *Journal of Fluids and Structures*, 80, 179-198.
 9. Ma, N., Lei, H., Han, Z., Zhou, D., Bao, Y., **Zhang, K.**, Zhou, L. & Chen, C. (2018). Airfoil optimization to improve power performance of a high-solidity vertical axis wind turbine at a moderate tip speed ratio. *Energy*, 150, 236-252.
 8. He, T., Zhang, H. & **Zhang, K.** (2018). A smoothed finite element approach for computational fluid dynamics: applications to incompressible flows and fluid-structure interaction. *Computational Mechanics*, 62(5), 1037-1057.
-
- 2017**
7. Ma, J., Zhou, D., Han, Z., **Zhang, K.**, Nguyen, J., Lu, J. & Bao, Y. (2017). Numerical simulation of fluctuating wind effects on an offshore deck structure. *Shock and Vibration*, 2017.
 6. He, T., **Zhang, K.** & Wang, T. (2017). AC-CBS-based partitioned semi-implicit coupling algorithm for fluid-structure interaction using stabilized second-order pressure scheme. *Communications in Computational Physics*, 21(5), 1449-1474.
 5. **Zhang, K.**, Katsuchi, H., Zhou, D., Yamada, H., Zhang, T. & Han, Z. (2017). Numerical simulation of vortex induced vibrations of a flexibly mounted wavy cylinder at subcritical Reynolds number. *Ocean Engineering*, 133, 170-181.
 4. He, T. & **Zhang, K.** (2017). An overview of the combined interface boundary condition method for fluid-structure interaction. *Archives of Computational Methods in Engineering*, 24(4), 891-934.
-
- Before 2016**
3. **Zhang, K.**, Katsuchi, H., Zhou, D., Yamada, H. & Han, Z. (2016). Numerical study on the effect of shape modification to the flow around circular cylinders. *Journal of Wind Engineering and Industrial Aerodynamics*, 152, 23-40.
 2. He, T. & **Zhang, K.** (2015). Combined interface boundary condition method for fluid-structure interaction: Some improvements and extensions. *Ocean Engineering*, 109, 243-255.
 1. Tu, J., Zhou, D., Bao, Y., Fang, C., **Zhang, K.**, Li, C., & Han, Z. (2014). Flow-induced vibration on a circular cylinder in planar shear flow. *Computers & Fluids*, 105, 138-154.

Conference Papers

- 1.

Conference Presentations

([†] invited)

- 1.