



# Junhao Ke

 0000-0002-1177-1834

 junhao.ke@sydney.edu.au

 (+61) 0 451 559 391

Faculty of Engineering and Information Technology  
The University of Sydney  
New South Wales 2006

## Education

---

**The University of Sydney**

NSW, Australia

*Doctor of Philosophy*

*March 2017 – May 2021*

Thesis: Direct numerical simulation of an unsteady natural convection boundary layer

Advisors: Dr. Nicholas Williamson & Prof. Steven Armfield

**The University of Sydney**

NSW, Australia

*Master of Professional Engineering*

*March 2015 – December 2016*

Advisors: Dr. Nicholas Williamson & Prof. Steven Armfield

**East China University of Science and Technology**

Shanghai, China

*Bachelor of Engineering*

*September 2010 – July 2014*

## Research Interests

---

Buoyant Driven Flows, Heat Transfer, Computational Fluid Dynamics, Statistical Computing,  
Turbulence, Boundary Layer Theory

## Publications

---

**Ke, J.**, Williamson, N., Armfield, S. W., Komiya, A., & Norris, S. E. (2021). High Grashof number turbulent natural convection on an infinite vertical wall. *Journal of Fluid Mechanics*, 929, A15.

**Ke, J.**, Williamson, N., Armfield, S. W., Norris, S. E., & Komiya, A. (2020). Law of the wall for a temporally evolving vertical natural convection boundary layer. *Journal of Fluid Mechanics*, 902, A31.

**Ke, J.**, , Williamson, N., Armfield, S. W., McBain, G. D., & Norris, S. E. (2019). Stability of a temporally evolving natural convection boundary layer on an isothermal wall. *Journal of Fluid Mechanics*, 877, 1163-1185.

**Ke, J.**, Williamson, N., Armfield, S. W., Norris, S. E., & Kirkpatrick, M. (2018). Direct numerical simulation of a temporally developing natural convection boundary layer on a doubly-infinite isothermal wall, *In Proceedings of IHTC-16. Begell House*.

## Work in Progress

---

**Ke, J.**, Williamson, N., Armfield, S. W., Komiya, A., & Norris, S. E. Turbulence statistics and budgets of a temporally developing natural convection boundary layer. (Submitted to *International Journal of Heat and Mass Transfer*)

## Conferences & Talks

---

Turbulence statistics in a temporally evolving turbulent natural convection boundary layer. In 18th International Conference on Flow Dynamics, Sendai, Miyagi Japan, 28-29 October 2021.

Integral modelling of an unsteady natural convection boundary layer. In 22nd Australasian Fluid Mechanics Conference, Brisbane, QLD Australia, 7-10 December 2020.

Application of an integral model to an unsteady natural convection boundary layer. In 11th Australasian Natural Convection Workshop, Sydney, NSW Australia, 9-10 December 2019.

DNS of a temporally evolving vertical natural convection boundary layer. In 17th European Turbulence Conference, Torino, Italy, 3-6 September 2019.

**Invited talk:** DNS study of a parallel vertical natural convection boundary layer. In Australia-Japan Fluid Dynamics Workshop, Sydney, NSW Australia, 31 January-1 February 2019.

Direct numerical simulation of a temporally developing natural convection boundary layer on a doubly-infinite isothermal wall. In 16th International Heat Transfer Conference, Beijing, China, 10-15 August 2018.

**Invited talk:** On the numerical simulation of a natural convection boundary layer. In the Centre of Wind, Waves and Water, Sydney, NSW Australia, 22 June 2018.

Direct numerical simulation of an unsteady natural convection boundary layer adjacent to a doubly-infinite isothermal wall. In 10th Australasian Natural Convection Workshop, Auckland, New Zealand, 30 November-1 December 2017.

## Honors & Awards

---

<b>Postgraduate Research Support Scheme</b> , Faculty of Engineering and IT, USyd	<i>2018, 2020, 2021</i>
<b>Charles Kolling Travelling Fund</b> , Faculty of Engineering and IT, USyd	<i>2019</i>
<b>Best Student Paper Award</b> in 10th Australasian Natural Convection Workshop	<i>2017</i>
<b>Natural Convection Supplementary Scholarship</b> , Faculty of Engineering and IT, USyd	<i>2017</i>
<b>USyd-IS Strategic Scholarship Award</b> , USyd	<i>2016</i>
<b>Dean's Excellency Award</b> , Faculty of Engineering and IT, USyd	<i>2015</i>
<b>Merit Academic Award</b> , Faculty of Engineering and IT, USyd	<i>2015</i>
<b>Third Prize Scholarship</b> , East China University of Science and Technology	<i>2014</i>
<b>Fei-yang Award</b> , East China University of Science and Technology	<i>2014</i>

## Teaching Experience

---

<b>Casual Lecturer and Unit of Study Coordinator</b> Faculty of Engineering and IT, USyd	<i>February 2022 – Present</i> NSW
<ul style="list-style-type: none"> <li>Deliver lectures, provide teaching materials and resources to tutors and students, as well as administering the assessments. Course includes: Engineering Analysis (AMME2000)</li> </ul>	
<b>Teaching Assistant</b> Faculty of Engineering and IT, USyd	<i>March 2017 – Present</i> NSW
<ul style="list-style-type: none"> <li>Deliver tutorial and lead discussion sessions to reinforce material covered in lectures. Supervise quizzes and evaluate student assignments, quizzes, exams, and other assessments. Course includes: Fluid Dynamics II (MECH3261), Thermal Engineering II (MECH3260), Advanced Computational Fluid Dynamics (AMME5202)</li> </ul>	

## Research Experience

---

<b>Postdoctoral Research Associate</b> School of Aerospace, Mechanical and Mechatronic Engineering, The University of Sydney	<i>March 2021 – Present</i> NSW, Australia
<ul style="list-style-type: none"> <li>Turbulent flows; Direct numerical simulation; Buoyancy induced flows; Boundary layers</li> </ul>	
<b>Visiting Researcher</b> Advanced Fluid Information Research Center, Institute of Fluid Science, Tohoku University	<i>September 2019 – October 2019</i> Sendai, Japan
<ul style="list-style-type: none"> <li>International cooperation on the natural convection/ventilation project</li> </ul>	

## Industry Experience

---

<b>Project Engineer</b> Department of Research & Development, Inalfa Co., Ltd.	<i>November 2015 – February 2016</i> Shanghai, China
<ul style="list-style-type: none"> <li>Experiment design &amp; validation</li> <li>Statistical analysis for experimental data</li> <li>Algorithm development for acoustic analysis programs</li> </ul>	
<b>Assistant Manager</b> Department of Construction & Excavation Machinery, Yanmar Engines Co.,	<i>June 2014 – December 2014</i> Shanghai, China
<ul style="list-style-type: none"> <li>Statistical analysis for recurrent event data</li> <li>Inventory control</li> </ul>	

## Service

**Volunteer** of China Open Day (USyd)

*2015*

- Providing assistance on behalf of the faculty of Engineering and IT with the USyd global student recruitment team.

### **Language**

---

**English** (fluent), **Japanese** (fluent), **Mandarin** (native) and **Shanghai Dialect** (native)