

# Tongbeum KIM

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## 1. PERSONAL DETAILS

### 1.1. Positions and Employment

- (11/2013 - present) Professor of Thermo/fluids  
 (05/2010 - 10/2013) Associate Professor  
 (05/2010 - 12/2012) Eskom Chair of Mechanical Engineering  
 School of Mechanical, Industrial and Aeronautical Engineering  
 University of the Witwatersrand, Johannesburg, South Africa.
- (01/2010 - 04/2010) Professor  
 (10/2005 - 12/2009) Associate Professor  
 School of Aerospace Engineering, Xi'an Jiaotong University, Xi'an, PR China.
- (06/2004 - 09/2005) BK 21 Postdoctoral Research Fellow  
 Turbomachinery Laboratory, School of Mechanical and Aerospace Engineering  
 Seoul National University, Seoul, South Korea.
- (01/2001-12/2003) Research Associate  
 Department of Engineering, University of Cambridge, Cambridge, UK.
- (04/1998 - 06/1999) Graduate Research Assistant  
 Experimental Aerodynamics Group, School of Aerospace Engineering  
 Georgia Institute of Technology, Atlanta, GA 30332, USA.

### 1.2. Education

- Ph.D. (05/2004) Whittle Laboratory, Department of Engineering, University of Cambridge, UK.
- M.Phil. (12/2000) Whittle Laboratory, Department of Engineering, University of Cambridge, UK.
- M.Sc. (12/1998) School of Aerospace Engineering, Georgia Institute of Technology, USA.
- B.Eng. (02/1997) Department of Mechanical Engineering, Kyunghee University, South Korea.

### 1.3. Awards

- The Outstanding Reviewer, the ASME Journal of Heat Transfer (11/2012).
- NRF Rating (C1, categorized as "while all reviewers concur that the applicant is an established researcher, some of them indicate that he already enjoys considerable international recognition for his high quality recent research outputs") by the National Research Foundation of South Africa (01/2012 - 12/2017).
- The HTFS Best Paper Award, the 8<sup>th</sup> UK National Heat Transfer Conference (09/2003).

### 1.4. Membership of Professional Bodies

- Member of Royal Aeronautical Society through the Aeronautical Society of South Africa (AeSSA) since 2013.

## 2. RESEARCH

### 2.1. Research Interests (Turbomachinery Aerodynamics and Heat Transfer)

- (a) Weight reduction of gas turbine blades using high-porosity porous media to promote internal cooling of the blade. Superior cooling of the blade allows for higher gas temperatures inside the turbine which improves the cycle efficiency of the gas turbine. However, cooling should be promoted with light-weight heat transfer configurations to ensure the inertia of the blade is kept to a minimum. A high porosity medium is, therefore, the ideal candidate for this application.
- (b) Axial compressor and turbine aerodynamics: the flow used to cool the interior of a turbine blade is typically ejected from the blade trailing edge into the mainstream. Mixing occurs between the ejected

coolant and the mainstream, because of substantial differences in velocity (or mass velocity), leading to aerodynamic loss which reduces gas turbine efficiency. The aerodynamics of this process is being explored for the purpose of engineering suggestions.

- (c) Jet impingement onto pin-fins in the trailing edge of a turbine blade. Turbine blade designs incorporate pin-fins to promote cooling of the trailing edge. Most turbine blade designs allow a uniform stream of flow to immerse the pin-fins. However, one recent design channels jets of flow onto the pin-fins in an attempt to promote heat transfer. The aerodynamics of this configuration is being explored.
- (d) Film cooling of a turbine blade. A turbine blade is conventionally cooled by two methods: (1) internal cooling through passages inside the blade; (2) film cooling with jets of coolant that form a protective film on the blade exterior. A new film cooling design has been developed which improves cooling of the suction side trailing edge while no additional consumption of coolant is required.
- (e) Flow control using aerodynamic anisotropy. Some porous media, like cylinder banks, exhibit a characteristic known as *aerodynamic anisotropy* which causes flow to incur a varying level of drag depending on the orientation of the porous material. Aerodynamic anisotropy can be used to control the distribution of flow inside of complex channel geometries like the trailing edge of a turbine blade. Previous work has shown that boundary layer separation can be prevented inside of extremely aggressive channel geometries using aerodynamically anisotropic porous media.

## 2.2. Internal & External Research Funds

### (Present)

- Incentive fund for rated researchers (01/2012-12/2017), National Research Foundation (NRF) of South Africa - (ZAR 40,000 per year, in total ZAR 240,000).
- Eskom TESP2015, South Africa, (01/2015-12/2015), "Testing of a newly developed three-dimensional wide-angle diffuser for application to electrostatic precipitators (ESPs)" - (ZAR 90,000).

### (Past)

- South Korea-South Africa Joint Research Project, (10/2011-09/2014), "Fluid-flow and heat transfer characteristics of single/multiple circular jet cooling on a circular furnace," sponsored by National Research Foundation (NRF) of Korea (with Seoul National University, South Korea) - (ZAR 700,000).
- Eskom TESP2014, South Africa, (01/2014-12/2014), "Development of a three-dimensional wide-angle diffuser for application to electrostatic precipitators (ESPs)" - (ZAR 80,000).
- Eskom TESP2013, South Africa, (01/2013-12/2013), "Development of a two-dimensional wide-angle diffuser for application to electrostatic precipitators (ESPs)" - (ZAR 75,000).
- Eskom TESP2012, South Africa, (01/2012-12/2012), "Vertical axis wind-turbines with local flow acceleration" - (ZAR 78,000).
- Eskom TESP2011, South Africa, (01/2011-12/2011), "Thermal performance of highly porous rotary regenerative heat exchangers" - (ZAR 65,000).
- Eskom GBE Research Project, South Africa, (06/2010-05/2011), "Ash silo aeration break through" - (ZAR 150,000).
- The National Natural Science Foundation of China (NSFC), (01/2007-12/2009, Grant number: 50676075), "Thermo-physical investigation in highly porous cellular materials subject to impingement of unsteady swirling flows" - (Chinese RMB 250,000).
- The National Basic Research Program of China, (01/2006-12/2010, Grant number: 2006CB601203), "Fundamental study of ultra-light porous structures in multifunctional innovative configuration" - (Chinese RMB 150,000).

## 2.3. Patents

- Isotropic planar illumination for PIV experiments, South African and International Patents (pending).
- A banked wide-angle diffuser in application to electrostatic precipitators, South African and International Patents (pending).
- Lightweight highly-porous ventilated brake discs for light/heavy duty vehicles, South African and International Patents (pending).
- Water-air-cooled highly porous truss-based vehicle radiators (Korean Patent No.: 10-1382936, 2013).
- An axial flow fan with hub fins in electronics cooling (Chinese Patent No.: ZL 2007-1-0307703.9, 2007).

## 2.4. Invited Talks & Keynote Lectures

- "Fundamental aspects on gas turbine blade cooling," Xi'an Jiaotong University, China (07/2014).
- "A porous ventilated brake disc: transient and steady-state thermal behaviors," Seoul National University, Korea (01/2014).
- "Secondary flow structures in a shrouded compressor cascade," Keynote Lecture, International Aerospace Symposium of South Africa (IASSA), Cape Town, South Africa (09/2013).
- "Tortuosity in two-phase porous media," Seoul National University, Korea (12/2012).
- "The effect of relative curvature of a cylinder cooled by a circular impinging jet in crossflow," Seoul National University, Korea (12/2012).
- "Mechanism of fly ash aeration break-through," North-West University, Potchefstroom, South Africa (06/2012).
- "Local flow disturbance of axial fan flow impinging on a flat plate due to hub fin attachments," Yonsei University, Seoul, Korea (08/2009).
- "Solidification in heterogeneous materials with closed cells," Chinese Academy of Science, Hefei, China (12/2007).
- "Influence of the leakage flow tangential velocity on the loss Generation in shrouded axial compressor cascades," School of Energy and Power Engineering, Xi'an Jiaotong University, Xi'an, China (11/2005).
- "Fluid-flow and heat-transfer in a lattice-frame material," BK21 Invited Seminar, School of Mechanical and Aerospace Engineering, Seoul National University, Seoul, Korea (10/2004).

## 3. TEACHING

### 3.1. Undergraduate Courses

- MECN 4021: Fluid Dynamics (Basic Concepts in Turbomachinery).
- MECN 4013: Thermal Systems (Applied Heat transfer).
- MECN 3023: Introduction to Nuclear Engineering (Nuclear Power Generation).
- MECN 3007: Mechanical Engineering Laboratories 2 - Conductive Heat Transfer in a Porous Medium.
- MECN 2005: Mechanical Engineering Laboratories 1 - (i) Flow-meter calibration and (ii) Conductive heat transfer in a solid.

### 3.2. Postgraduate Courses for Eskom Power Plant Engineering Institute (EPPEI)

- Heat Transfer in Coal-Fired Power Generation.

### 3.3. Thesis Supervision

#### (Present students)

- A.M. Nguepnang, "Heat transfer mechanism of slot jet impingement on a concave surface," M.Sc. (01/2015 - present).
- M. Atkins, "Driving mechanisms of gap flow between two side-by-side circular cylinders," M.Sc. (02/2013 - 05/2015), University of the Witwatersrand, Johannesburg, South Africa.
- D. Barratt, "Impingement of a single and multiple round jets on a circular cylinder," M.Sc. (2013 - present), Seoul National University, Seoul, South Korea (co-supervision with Prof. S.J. Song).
- X.L. Wang, "Round jet impingement on a circular pin-fin," Ph.D. (2009 - present), Xi'an Jiaotong University, Xi'an, China (co-supervision with Prof. T.J. Lu).

#### (Past students)

- X.H. Yang, "Conduction heat transfer in engineering porous media," Ph.D. (2010 - 2014), Xi'an Jiaotong University, Xi'an, China (co-supervision with Prof. T.J. Lu).
- J.J. Kuang, "Thermo-fluidic characteristics in metallic foams with open cells subject to an impinging jet with various flow profiles," Ph.D. (2007 - 2014), Xi'an Jiaotong University, Xi'an, China (co-supervision with Prof. T.J. Lu).
- S.S. Feng, "Steady and transient heat transfer of forced convection in fin heat sinks subjected to non-uniform hot jet heating," Ph.D. (2005 - 2010), Xi'an Jiaotong University, Xi'an, China.
- H.Q. Yang, "Experimental investigation on annular swirling impinging jet," M.Sc. (2007 - 2009), Xi'an Jiaotong University, Xi'an, China.
- B. Zhang, "Heat transfer in solidification process during manufacturing of closed-celled metal foams via foaming of melt," M.Sc. (2006 - 2008), Xi'an Jiaotong University, Xi'an, China.

- H. Wei, "Flow behavior of ultrasonic acoustic streaming with cavitation bubbles confined by a bounding wall", M.Sc. (2006 - 2008), Xi'an Jiaotong University, Xi'an, China.
- D. Sui, "Flow behavior and thermal performances of aluminum foam heat sinks impinged by axial fan flows," M.Sc. (2005 - 2007), Xi'an Jiaotong University, Xi'an, China.

## **4. ACADEMIC SERVICES & SCHOLARLY ACTIVITIES**

### **4.1. Management experience**

- Head of Thermodynamics and Fluid Mechanics Division within the School of Mechanical, Industrial and Aeronautical Engineering, comprising 7 faculty members (1 professor, 2 associate professors, 3 senior lecturers, 1 associate lecturer) (11/2013 - present)
- Founding member and Acting Chair of Eskom Power Plant Engineering Institute (EPPEI) within the School of Mechanical, Industrial and Aeronautical Engineering (10/2010 – 12/2012).

### **4.2. External Scholarly Activities**

- Reviewer for NRF rating, South Africa (08/2014).
- External examiner for promotion at the University of Johannesburg (07/2014).
- Technical / scientific committee member, the 9<sup>th</sup> South African Conference on Computational and Applied Mechanics (SACAM2014), January 14-16, 2014, Somerset West, South Africa.
- Session review organizer of Conference on Modeling Fluid Flow (CMFF), the 15th International Conference on Fluid Flow Technologies, September 4-7 (2012), Budapest, Hungary.
- Review panel member for the NRF of South Africa Initiated Programs (2012).
- Local steering committee member, Joint International Symposia on 3<sup>rd</sup> Micro and Nano Technology and Macro/nanoscale Energy Conversion & Transport (MNT-MECT-2010), March 21-24, 2010, Seoul, Korea.
- Local organizing committee member, 14<sup>th</sup> International Symposium on Applied Electromagnetics and Mechanics (ISEM 2009), September 20-24, 2009, Xi'an, China.

### **4.3. Reviewer (for International Journals)**

- (1) Experimental Thermal Fluid Science
- (2) AIAA J. Thermophysics and Heat Transfer
- (3) ASME J. Heat Transfer
- (4) International J. Heat and Mass Transfer
- (5) International J. Heat and Fluid Flow
- (6) International J. Thermal Sciences
- (7) Heat Transfer Engineering
- (8) ASME J. Electronic Packaging
- (9) J. Visualization
- (10) J. Porous Media
- (11) Energy

## + A LIST OF PUBLICATIONS

### A. Peer-Reviewed Journal Articles

#### (In preparation)

- D. Barratt, S.J. Song, T. Kim, "Horseshoe vortices around backward inclined circular cylinders," *Physics of Fluids*.
- T. Kim, "Anisotropic permeability in a metallic Kagome lattice," *ASME Journal of Heat Transfer*.
- T. Kim, "Effects of a swirl developing length of annular swirling jets on impinging cooling characteristics," *ASME Journal of Fluids Engineering*.
- M.D. Atkins, T. Kim, "Bypass film cooling for a turbine blade trailing edge," *ASME Journal of Turbomachinery*.
- M.D. Atkins, T. Kim, "Cross-over jet impingement on short circular pin-fins at a turbine blade trailing edge," *ASME Journal of Turbomachinery*.
- X.L. Wang, T.J. Lu, T. Kim, "Offset crossover jet cooling of a circular long cylinder," *AIAA Journal of Thermophysics and Heat Transfer*.
- X.L. Wang, T.J. Lu, T. Kim, "Offset crossover jet impingement on a confined circular short pin-fin," *ASME Journal of Heat Transfer*.
- T. Kim, "Recent advances in submerged impinging jets," *Advances in Heat Transfer*.
- A.M. Nguenpnang, T. Kim, "Thermo-fluidic comparisons of round and slot jet impingement on a concave surface," *International Journal of Heat and Mass Transfer*.
- M.D. Atkins, A.M. Nguenpnang, T. Kim, "Fundamental aspects of heat transfer on a circular cylinder subject to uniform flow and impinging jets," *ASME Journal of Heat Transfer*.
- K.J. Phahlamohlaka, A.M. Nguenpnang, T. Kim, "Heat transfer in a bank of short pin-fins subject to an individual round jet impingement," *ASME Journal of Thermal Science and Engineering Applications*.
- A.M. Nguenpnang, T. Kim, "Off-set slot jet impingement on a concave surface," *ASME Journal of Thermal Science and Engineering Applications*.
- M.D. Atkins, T. Kim, "Aerodynamic loss generation due to bypass film cooling at a turbine blade trailing edge," *ASME Journal of Turbomachinery*.
- S. Schekman, N. Msibi, T. Kim, "Flow around a fully permeable short circular cylinder," *Journal of Fluid Mechanics*.

#### (Submitted)

- J.J. Kuang, T.J. Lu, T. Kim, "The role of laminar length of a round jet in determining impingement heat transfer in a metal foam," *AIAA Journal of Thermophysics and Heat Transfer*.
- D. Barratt, J. Lee, T. Kim, S.J. Song, "Jet impingement cooling of a circular cylinder," *ASME Journal of Fluids Engineering*.
- A.M. Nguenpnang, M. Boer, T. Kim, "Stagnation heat transfer on a concave surface subject to slot jet impingement," *ASME Journal of Heat Transfer*.
- M.D. Atkins, T. Kim, "Cross-over jet around a circular cylinder," *Journal of Fluid Mechanics*.

#### (2015)

- M.D. Atkins, L. Dala, T. Kim, "Driving mechanisms of gap flow between two stationary side-by-side circular cylinders," *Physics of Fluids* (under revision).
- M.D. Atkins, T. Kim, "Isotropic planar illumination for PIV experiments," *Experiments in Fluids* (under revision).
- T. Mew, K-J. Kang, F.W. Kienhofer, T. Kim, "Transient thermal response of solid, pinned and highly porous ventilated brake discs," *IMEchE Part D: Journal of Automobile Engineering* 229(\*) (2015):00-00.
- D. Barratt, T. Kim, "A banked wide-angle diffuser in application to electrostatic precipitators," *IMEchE Part A: Journal of Power and Energy* 229(1) (2015): 00-00.
- H.B. Yan, T. Mew, M-G. Lee, K-J. Kang, T.J. Lu, F.W. Kienhofer, T. Kim, "Thermo-fluidic characteristics of a porous-ventilated brake disc," *ASME Journal of Heat Transfer* 137(2) (2015): 022601-1-11.

#### (2014)

- X.L. Wang, J.H. Lee, T.J. Lu, S.J. Song, T. Kim, "A comparative study of single-/two-jet crossflow heat transfer on a circular cylinder," *International Journal of Heat and Mass Transfer* 78 (2014): 588-598.

- X.H. Yang, J.X. Bai, K-J. Kang, T.J. Lu, T. Kim, "Experimental investigations of natural convection in wire-woven bulk Kagome," *Transport in Porous Media* 105(1) (2014): 1-22.
- X.H. Yang, T.J. Lu, T. Kim, "An analytical model for permeability in isotropic porous media," *Physics Letters A* 378 (2014): 2308-2311.
- X.H. Yang, T.J. Lu, T. Kim, "Experimental investigation of chimney-enhanced natural convection in hexagonal honeycombs," *Theoretical and Applied Mechanics Letters* 4(3) (2014): 032005-1-6.
- X.H. Yang, J.X. Bai, H.B. Yan, J.J. Kuang, T.J. Lu, T. Kim, "An analytical unit cell model for the effective thermal conductivity of high porosity open-cell metal foams," *Transport in Porous Media* 102(3) (2014): 403-426.
- X.L. Wang, H.B. Yan, T.J. Lu, S.J. Song, T. Kim, "Heat transfer characteristics of an inclined impinging jet on a curved surface in crossflow," *ASME Journal of Heat Transfer* 136(8) (2014): 081702-1-10.
- X.L. Wang, D. Motala, T.J. Lu, S.J. Song, T. Kim, "Heat transfer of a circular impinging jet on a circular cylinder in crossflow," *International Journal of Thermal Sciences* 78 (2014): 1-8.

### (2013)

- X.H. Yang, T.J. Lu, T. Kim, "Effective thermal conductivity modeling for closed-cell porous media with analytical shape factors," *Transport in Porous Media* 100(2) (2013): 211-224.
- X.H. Yang, J.J. Kuang, H.S. Han, T.J. Lu, T. Kim, "A simplistic analytical unit cell based model for the effective thermal conductivity of high porosity metal foams with open cells," *Journal of Physics D: Applied Physics* 46(25) (2013): 255302-1-6.
- X.H. Yang, T.J. Lu, T. Kim, "Thermal stretching in two-phase porous media: physical basis of Maxwell model," *Theoretical and Applied Mechanics Letters* 3(2) (2013): 021011-1-5.
- X.H. Yang, T.J. Lu, T. Kim, "A simplistic model for the tortuosity in two-phase close-celled porous media," *Journal of Physics D: Applied Physics* 46(12) (2013): 125305-1-4.
- X.H. Yang, T.J. Lu, T. Kim, "Influence of non-conducting pore inclusions on phase change behavior of porous media with constant heat flux boundary," *International Journal of Thermal Sciences* 64 (2013): 137-144.
- S.S. Feng, T. Kim, T.J. Lu, "Numerical investigation of forced convection in pin/plate-fin heat sinks heated by impinging jet using porous medium approach," *International Journal of Numerical Methods for Heat and Fluid Flow* 23(1) (2013): 88-107.

### (2012)

- J.J. Kuang, T. Kim, M.L. Xu, T.J. Lu, "Ultralightweight compact heat sinks with metal foams under axial fan flow impingement," *Heat Transfer Engineering* 33(7) (2012): 642-650.
- S.S. Feng, M. Z. Li, J-H. Joo, K-J. Kang, T. Kim, T.J. Lu, "Thermo-mechanical properties of brazed wire-woven bulk Kagome cellular metals for multifunctional applications," *AIAA Journal of Thermophysics and Heat Transfer* 26(1) (2012): 66-74.

### (2011)

- X.H. Yang, T.J. Lu, T. Kim, "Temperature effects on the effective thermal conductivity of phase change materials with two distinctive phases," *International Communications in Heat and Mass Transfer* 38(10) (2011): 1344-1348.
- J-H. Joo, K-J. Kang, T. Kim, T.J. Lu, "Forced convective heat transfer in all metallic wire-woven bulk Kagome sandwich panels," *International Journal of Heat and Mass Transfer* 54(25-26) (2011): 5658-5662.
- J.W. Kim, S.J. Song, T. Kim, "Stream-wise evolution of loss in a shrouded axial compressor cascade passage," *AIAA Journal of Propulsion and Power* 27(4) (2011): 884-889.
- S.S. Feng, T. Kim, T.J. Lu, "Transient thermal response of pin-fin sandwich panels to cyclic non-uniform impinging heat loads," *ASME Journal of Heat Transfer* 133(6) (2011): 061901-1-11.
- H.Q. Yang, T. Kim, T.J. Lu, "Characteristics of annular impinging jets with/without swirling flow by short guide vanes," *Science China Technological Sciences* 54(3) (2011): 749-757.
- S.S. Feng, T. Kim, T.J. Lu, "Thermal resistance analysis of pin-fin heat sinks under nonuniform impingement heating," *AIAA Journal of Thermophysics and Heat Transfer* 25(1) (2011): 119-129.

### (2010)

- M. Lin, Q.D. Liu, T. Kim, B.F. Bai, T.J. Lu, "A new method for characterization of thermal properties of human enamel and dentine: Influence of microstructure," *Infrared Physics & Technology* 53(6) (2010): 457-463.

- S.S. Feng, T. Kim, T.J. Lu, "A semi-empirical heat transfer model for forced convection in pin-fin heat sinks subjected to non-uniform heating," *ASME Journal of Heat Transfer* 132(12) (2010): 121702-1-11.
- H.Q. Yang, T. Kim, T.J. Lu, K. Ichimiya, "Flow structure, wall pressure, and heat transfer characteristics of impinging annular jet with/without steady swirling," *International Journal of Heat and Mass Transfer* 53(19-20) (2010): 4092-4100.
- B. Zhang, T. Kim, T.J. Lu, "Solidification in a continuous medium with periodically distributed non-conducting two-dimensional circular pores," *AIAA Journal of Thermophysics and Heat Transfer* 24(2), (2010): 348-354.
- O. Vipat, X.G. Tian, T. Kim, T.J. Lu, A.M. Pradeep, "Thermal stress induced by inclined impinging heating jet on a flat plate," *AIAA Journal of Thermophysics and Heat Transfer* 24(1) (2010): 218-221.

#### **(2009)**

- J.W. Kim, T. Kim, S.J. Song, "Effects of the leakage flow tangential velocity in shrouded axial compressor cascades," *Tsinghua Science and Technology* 14(S2) (2009): 105-110.
- O. Vipat, S.S. Feng, T. Kim, A.M. Pradeep, T.J. Lu, "Asymmetric entrainment effect on the local surface temperature of a flat plate heated by an obliquely impinging 2-dimensional jet", *International Journal of Heat and Mass Transfer* 52(22) (2009): 5250-5257.
- K.J. Kang, T. Kim, S.J. Song, "Strengths of horseshoe vortices around a circular cylinder with upstream cavity," *Journal of Mechanical Science and Technology* 23(7) (2009): 1773-1778.
- D. Sui, T. Kim, T.J. Lu, "Novel hub fins of an axial flow fan for the enhancement for impinging heat transfer on a flat plate," *ASME Journal of Heat Transfer* 131(7) (2009): 074502.
- B. Zhang, T. Kim, T.J. Lu, "The solidification of two-phase heterogeneous materials: Theory versus experiment," *Science China Technological Sciences* 52(6) (2009): 1688-1697.
- D. Sui, T. Kim, S.S. Wang, J.R. Mao, T.J. Lu, "Exit flow behaviour of axial fan flows with/without impingement," *ASME Journal of Fluids Engineering* 131(6) (2009): 061103.
- T.J. Lu, G.Q. Gao, S.L. Ma, F. Jin, T. Kim, "Acoustic band gaps in two-dimensional square arrays of semi-hollow circular cylinders," *Science China Technological Sciences* 52(2) (2009): 303-312.
- B. Zhang, T. Kim, T.J. Lu, "Analytical solution for solidification of close-celled metal foams," *International Journal of Heat and Mass Transfer* 52(1) (2009): 133-141.

#### **(2008)**

- T. Kim, T.J. Lu, "Pressure drop through anisotropic porous medium-like cylinder bundles in turbulent flow regime," *ASME Journal of Fluids Engineering* 130(10) (2008): 104501.
- D. Sui, T. Kim, M.L. Xu, T.J. Lu, "Flow and heat transfer characteristics of impinging axial fan flows on a uniformly heated flat plate," *International Journal of Transport Phenomena* 10(4) (2008): 353-363.

#### **(2007)**

- I.K. Choi, T. Kim, S.J. Song, T. J. Lu, "Endwall heat transfer and fluid-flow around an inclined short cylinder," *International Journal of Heat and Mass Transfer* 50(5) (2007): 919-930.

#### **(2006)**

- T. Kim, H.P. Hodson, T.J. Lu, "On the prediction of pressure drop across banks of inclined cylinders," *International Journal of Heat and Fluid Flow* 27(2) (2006): 311-318.

#### **(2005)**

- T. Kim, H.P. Hodson, T.J. Lu, "Contribution of vortex structures and flow separation to local pressure and heat transfer characteristics in an ultralightweight lattice material," *International Journal of Heat and Mass Transfer* 48(19-20) (2005): 4243-4264.
- A.J. Fuller, T. Kim, H.P. Hodson, T.J. Lu, "Measurements and interpretation of the heat transfer coefficients of metal foams," *IMEchE Part C: Journal of Mechanical Engineering Science*, 219(2) (2005): 183-191.

#### **(2004)**

- T. Kim, H.P. Hodson, T.J. Lu, "Pressure loss and heat transfer mechanisms in a lattice-frame structured heat exchanger," *IMEchE Part C: Journal of Mechanical Engineering Science*, 218(11) (2004): 1321-1336.
- T. Kim, H.P. Hodson, T.J. Lu, "Fluid-flow and endwall heat-transfer characteristics of an ultralight lattice-frame material" *International Journal of Heat and Mass Transfer* 47(6-7) (2004): 1129-1140.
- T. Kim, C.Y. Zhao, H.P. Hodson, T.J. Lu, "Convective heat dissipation with lattice-frame materials" *Mechanics*



of *Materials* 36(8) (2004): 767-780.

- J. Tian, T. Kim, T.J. Lu, H.P. Hodson, D.T. Queheillalt, H.N.G. Wadley, "The effects of topology upon fluid-flow and heat transfer within cellular copper structures," *International Journal of Heat and Mass Transfer* 47(14-16) (2004): 3171-3186.
- C.Y. Zhao, T. Kim, T.J. Lu, H.P. Hodson, "Thermal transport in high porosity cellular metal foams," *AIAA Journal of Thermophysics and Heat Transfer* 18(3) (2004): 309-317.

## B. Books & Chapters in Books

- S.S. Feng, J.J. Kuang, T. Kim, T.J. Lu, Heat Exchangers: Types, Design, and Applications, Chapter 1: Lightweight compact heat exchangers with open-cell metal foams, pp. 1-42, edited by S.T. Branson, *Nova Science Publishers*, USA (2011), ISBN: 978-1-61761-308-1.
- T. Kim, S.J. Song, T.J. Lu, Fluid-flow and Heat-transfer Measurement Techniques, English Technical Monograph Series, *XJTU Press*, China (2009), ISBN: 978-7-5605-2984-4.

### (In preparation)

- T. Kim, T.J. Lu, S.J. Song, Application of Essential Thermo-Fluidic Measurement Techniques, *Elsevier*.

## C. Conference Proceedings

- K-J. Kang, T. Mew, F.W. Kienhofer, T. Kim, "The use of a cellular material core to reduce the operating temperature of brake discs," Cellular Materials (CellMAT2014), October 22-24 (2014), Dresden, Germany.
- D. Barratt, J. Lee, T. Kim, S. Song, "Round-Jet Impingement on a Circular Pin-fin" Asian Congress on Gas Turbines (ACGT), 18-20 August (2014), Seoul, Korea, Paper No. ACGT2014-143.
- D. Barratt, T. Kim, "Flow control with a cylinder bank in a wide-angle diffuser," 15<sup>th</sup> International Symposium on Transport Phenomena and Dynamics of Rotating Machinery (ISROMAC-15), February 24-28 (2014), Honolulu, HI, USA.
- M. Atkins, L. Dala, T. Kim, "Classification of gap flow regimes in side-by-side circular cylinders," 15<sup>th</sup> International Symposium on Transport Phenomena and Dynamics of Rotating Machinery (ISROMAC-15), February 24-28 (2014), Honolulu, HI, USA.
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