Hyun Jin Kim, Ph.D.

hyunjin.kim@ua.edu • (832) 374-8731 • 3043 H.M. Comer, 245 7th Avenue, Tuscaloosa, AL 35401

ACADEMIC APPOINTMENTS

University of Alabama, Assistant Professor of Mechanical Engineering — May 2020 - Present
Stanford University, Postdoctoral Scholar (*Supervisor: Kenneth E. Goodson*) — May 2019 - May 2020

EDUCATION AND TRAINING

University of Illinois at Urbana-Champaign (UIUC), Urbana, IL
Ph.D. in Theoretical & Applied Mechanics (*Advisor: Anthony M. Jacobi*) — May 2019
M.S. in Mechanical Engineering — May 2014

Rice University, Houston, TX
B.S. in Mechanical Engineering & B.A. in Visual Arts — May 2011

Indian Institute of Technology (IIT) Bombay, Mumbai, India
Rice Engineering Student Exchange program at IIT — Jan. 2009 - July 2009

RESEARCH EXPERIENCE

Postdoctoral Research Fellow, *Nanoheat Laboratory, Stanford University* — May 2019 - May 2020

· Conducted research on thermo-fluid fundamentals associated with, i) embedded cooling for power electronics applications, ii) fast charging/discharging of mobile energy storage systems, and iii) continuously cycled water (CCW) harvesting system from the atmosphere

Mavis Future Faculty Fellow, *College of Engineering, UIUC* — Aug. 2017 - May 2018

Research Assistant, *Air Conditioning & Refrigeration Center (ACRC), UIUC* — Jan. 2016 - May 2019

· Studied heat transfer and pressure drop characteristics of various refrigerants (R-134a, R-245fa, etc.) near the micro-macroscale boiling transition in complex corrugated channels of plate heat exchangers (PHEs) and brazed plate heat exchangers (BPHEs)

Clean Energy Education Fellow, *Graduate College, UIUC* — Aug. 2014 - May 2016

· Prototyped unmanned-aerial-vehicle-based airflow measurement system utilizing hexacopter kits with GPS and Arduino platform

· Mentored and led a team of three undergraduate research assistants to pilot a fleet of hexacopters for collecting and analyzing turbulent wind and wake data

REFEREED JOURNALS

[-] **H. J. Kim**, L. Liebenberg, and A. M. Jacobi, "R-245fa boiling at low mass flux in a plate heat exchanger near the micro-macroscale transition," in preparation.

[4] **H. J. Kim**, L. Liebenberg, and A. M. Jacobi, "Flow visualization of two-phase R-245fa at low mass flux in a plate heat exchanger near the micro-macroscale transition," *Sci. Tech. Built Env.*, 25(10), 1292-1301, 2019.

[3] **H. J. Kim**, L. Liebenberg, and A. M. Jacobi, "Convective boiling of R-134a near the micro-macroscale transition inside a vertical brazed plate heat exchanger," *J. Heat Transf.*, 140(9), 091501, 2018.

[2] N. Möller, **H. J. Kim**, V. S. Neary, M. H. García, and L. P. Chamorro, "On the near-wall effects induced by an axial-flow rotor," *Renew. Energ.*, 91, 524 - 530, 2016.

[1] J. Zhu, **H. J. Kim**, and S. G. Kapoor, "Microscale drilling of bulk metallic glass," *J. Micro Nano-Manuf.*, 1(4), 041004, 2013.

INVITED TALKS

[5] **H. J. Kim**, "Convective boiling of refrigerants near the micro-macroscale transition inside plate heat exchangers," seminar at *Northern Arizona University*, Flagstaff, AZ, Mar. 4, 2020.

[4] **H. J. Kim**, "Convective boiling of refrigerants near the micro-macroscale transition inside plate heat exchangers," seminar at *the University of Alabama*, Tuscaloosa, AL, Feb. 27, 2020.

[3] **H. J. Kim**, "Convective boiling of refrigerants near the micro-macroscale transition inside plate heat exchangers," seminar at *the University of Memphis*, Memphis, TN, Feb. 21, 2020.

[2] **H. J. Kim**, "Convective boiling of refrigerants near the micro-macroscale transition inside plate heat exchangers," seminar at *Purdue University*, West Lafayette, IN, Feb. 13, 2020.

[1] **H. J. Kim**, "Convective boiling of refrigerants near the micro-macroscale transition inside plate heat exchangers," seminar at *Sookmyung Women's University*, Seoul, Korea, Oct. 24, 2019.

REFEREED CONFERENCE PROCEEDINGS

[-] **H. J. Kim**, K. W. Jung, S. Hazra, M. Asheghi, and K. E. Goodson, "Development of 3D-printed manifolds to reduce pressure drop in embedded microchannel coolers for high heat-flux electronics applications," abstract submitted for publication in *Proc. of Intl. Tech. Conf. and Exhibition on Packaging & Integration of Electronic and Photonic Microsystems (InterPACK)*, Anaheim, CA, Oct. 27 - 29, 2020.

[-] K. W. Jung, **H. J. Kim**, H. Lee, F. Zhou, M. Asheghi, E. Dede, and K. E. Goodson, "The effect of geometric changes in embedded microchannel-3D manifold cooling device on thermofluidic characteristics," abstract submitted for publication in *Proc. of IEEE Intersociety Conf. on Thermal & Thermomechanical Phenomena in Electronic Systems (ITherm)*, Orlando, FL, May 26 - 29, 2020.

[4] **H. J. Kim**, L. Liebenberg, and A. M. Jacobi, "Flow visualization of two-phase R-245fa at low mass flux in a plate heat exchanger near the micro-macroscale transition," *Proc. of the 17th Intl. Refrigeration & Air Conditioning Conf.*, West Lafayette, IN, July 9 - 12, 2018. **2nd Place Paper Award**.

[3] **H. J. Kim**, L. Liebenberg, and A. M. Jacobi, "Thermal-hydraulic performance of R-134a boiling at low mass fluxes in a vertical brazed plate heat exchanger," *Proc. of American Society of Mechanical Engineers (ASME) Summer Heat Transfer Conf.*, Bellevue, WA, July 9 - 14, 2017.

[2] J. Zhu, **H. J. Kim**, and S. G. Kapoor, "Microscale drilling of bulk metallic glass," *Proc. of the 8th Intl. Conf. on Micromanufacturing*, Victoria, BC, Canada, Mar. 26 - 28, 2013. **Best Paper Award**.

[1] **H. J. Kim** and D. C. Kyritsis, "Exergetic analysis of power plants operating on biomaterials," *Proc. of Power and Energy Conf. at Illinois*, Urbana, IL, Feb. 22 - 23, 2013.

ORAL PRESENTATIONS

H. J. Kim, L. Liebenberg, and A. M. Jacobi, "Flow visualization of two-phase R-245fa at low mass flux in a plate heat exchanger near the micro-macroscale transition," presentation at *the Intl. Refrigeration & Air Conditioning Conf.*, West Lafayette, IN, July 9 - 12, 2018. **2nd Place Paper Award**.

H. J. Kim and A. M. Jacobi, "Heat transfer and pressure drop for plate heat exchangers (PHEs)," presentations at *ACRC Industrial Advisory Board (IAB) Meetings*, Urbana, IL, Oct. 5 - 6, 2016, Oct. 4 - 5, 2017, and Oct. 10 - 11, 2018.

A. M. Jacobi and **H. J. Kim**, "Analytical and experimental study of 3D printed thermal composites for advanced phase change material (PCM) thermal energy storage (project proposal)," presentation at *ACRC IAB Meeting*, Urbana, IL, April 4 - 5, 2018.

H. J. Kim, L. Liebenberg, and A. M. Jacobi, "Thermal-hydraulic performance of R-134a boiling at low mass fluxes in a vertical brazed plate heat exchanger," presentation at *American Society of Mechanical Engineers (ASME) Summer Heat Transfer Conf.*, Bellevue, WA, July 9 - 14, 2017.

POSTER PRESENTATIONS (SELECTED)

H. J. Kim and A. M. Jacobi, "Convective boiling of refrigerants near the micro-macroscale transition inside plate heat exchangers," poster presentation at *The Rising Stars Women in Engineering, Seoul Ntl. Univ.*, Seoul, Korea, Oct. 24 - 27, 2019.

H. J. Kim and A. M. Jacobi, "Heat transfer and pressure drop for plate heat exchangers (PHEs)," poster presentations at *ACRC IAB Meetings*, Urbana, IL, Mar. 30 - 31 & Oct. 5 - 6, 2016, Mar. 29 - 30 & Oct. 4 - 5, 2017, April 4 - 5 & Oct. 10 - 11, 2018, and April 3 - 4, 2019.

H. J. Kim, L. Liebenberg, and A. M. Jacobi, "Flow visualization of R-245fa boiling in a brazed plate heat exchanger near the micro-macroscale transition," poster presentation at *the 10th Intl. Conf. on Boiling & Condensation Heat Transf.*, Nagasaki, Japan, Mar. 12 - 15, 2018.

H. J. Kim, J. Yang, and A. M. Jacobi, "Performance of brazed plate heat exchangers with two-phase flow," poster presentation at *WE16, Annual SWE Conference 2016*, Philadelphia, PA, Oct. 29, 2016.

WORKSHOPS AND PANEL DISCUSSIONS

J. Burek, R. Horvatek, T. Jovanovic, **H. J. Kim**, and S. M. Sherugar, "I'm an alien; I'm an international graduate student in the United States," oral presentation and panel discussion at *WE16, Annual SWE Conf. 2016*, Philadelphia, PA, Oct. 29, 2016.

H. Cha, **H. J. Kim**, S. Li, and J. Wu, "Internship opportunities for international students," panel discussion at *International Student Career Certificate Workshop Series*, Urbana, IL, April 7, 2015.

H. J. Kim, X. Liu, and Y. Wang, "Culture of the American workplace," panel discussion at *International Student Career Certificate Workshop Series*, Urbana, IL, April 8, 2014.

C. Owen, J. Vinekar, J. Gulati, and **H. J. Kim**, "Studying abroad-abroad: the culture of international students studying abroad again," oral presentation at *the N. American Higher Education Conf.*, Houston, TX, April 22, 2010.

FELLOWSHIPS

Mavis Future Faculty Fellowship, UIUC	2017 - 2018
Clean Energy Education Fellowship, UIUC	2014 - 2016
Link Foundation Energy Fellowship - Honorable Mention, Link Foundation	2014 - 2016
Amelia Earhart Fellowship - Finalist, Zonta International	2014 - 2015

AWARDS, HONORS, AND SCHOLARSHIPS

The Rising Stars Women in Engineering, Seoul National University, Korea	2019
The Rising Stars in Mechanical Engineering, MIT	2018
2nd Place Paper Award, 17th International Refrigeration & Air conditioning Conference	2018
Society of Women Engineers (SWE) Central Illinois Scholarship, SWE	2017 - 2018
Graduate College Conference Travel Award, UIUC	2017
Alwin Schaller Mechanical Science & Engineering Conference Travel Award, UIUC	2017
NSF ASSIST Travel Grant, Academic Leadership for Women in Engineering, SWE	2017
Finalist Travel Grant, Collegiate Technical Poster Competition, SWE	2016
Lydia I. Pickup Memorial Scholarship - Declined by the Awardee, SWE	2014 - 2015
Best Paper Award, 8th International Conference on Micromanufacturing (ICOMM)	2013
George P. and Amanda B. Hanley Scholarship, UIUC	2012 - 2013
Charles Wert India-Illinois Scholarship, UIUC	2012 - 2013
Dean of Engineering Study Abroad Scholarship, Rice University	2009

TEACHING EXPERIENCE

Mavis Future Faculty Fellow, *College of Engineering, UIUC*

Intermediate Heat Transfer (ME 420) Aug. 2017 - Dec. 2017

- Lectured on conduction, convection, boiling, and heat exchangers topics
- Assisted preparation and grading of quizzes and final exam

Teaching Assistant, *College of Engineering, UIUC*

Computer-Aided Design (ME 170) Jan. 2014 - May 2014

- Guided weekly laboratory and help sessions to assist students' Creo Parametric software training
- Consulted student design projects and provided feedback on their CAD models

Computer-Aided Manufacturing Systems & Design (ME 451) Aug. - Dec. 2012 & 2013

- Developed new lab programs for additive manufacturing and quality control topics
- Managed lab sessions on CAD, CNC (computer numerical control) machining, CMM (coordinate-measuring machine) with optical metrology, quality control, additive manufacturing, and robotics

Design for Manufacturability (ME 350) Jan. 2013 - May 2013

- Led lab sessions on CAD, CAM (computer-aided manufacturing), rapid prototyping, injection molding, sand casting, DOE (design of experiments), FBC (feature-based costing), and assembly design
- Graded laboratory reports based on experimental result analysis and quality of technical writing

Techniques for Engineering Decisions (ECE 307) Jan. 2013 - May 2013

- Lectured on networks and flows topics
- Held weekly help sessions to answer students' questions regarding problem sets
- Provided feedback on students' semester-long consulting projects based on real-world problems

LEADERSHIP AND INVOLVEMENT

Co-Founder & Planning Committee Member, *Women Empowered in STEM (weSTEM) Conference*

Attendee Relations Coordinator May 2015 - May 2016

- Managed application and registration procedures for 114 UIUC students, 24 non-UIUC attendees, and 19 speakers and guests
- Reviewed the applications and allocated total $3,875 travel grants for 16 non-UIUC attendees

Logistics Coordinator May 2013 - May 2015

- Handled conference logistics, including facility, food, and audiovisual, for 150 attendees
- Manage a subcommittee of volunteers to organize event day logistics and technical support

Co-Founder & Finance Coordinator Aug. 2012 - May 2013

- Managed budget of $31,500 for the inaugural weSTEM Conference
- Invited speakers from ExxonMobil (Ms. Marilyn Tears) and PowerWorld (Dr. Kate Rogers Davis)
- Secured $3,000 sponsorship from the Department of Electrical and Computer Engineering at UIUC

Co-Founder, GradSWE at UIUC, *Society of Women Engineers (SWE)* Jan. 2012 - Aug. 2012

- Established the Graduate Society of Women Engineers (GradSWE) for the SWE UIUC Section
- Initiated helpful programs for graduate students, such as weSTEM conference and biweekly lunch series with topics on professional development and academic discussion

SERVICE TO PROFESSION

Judge, *Society of Women Engineers Scholarships* 2020

INDUSTRY EXPERIENCE

Fluid Dynamics Intern, *Daimler Trucks North America* May 2015 - Aug. 2015

- Conducted particle image velocimetry (PIV) measurements on a full-scale truck body inside the wind tunnel to visualize the detailed flow field around vehicle components
- Analyzed the PIV results for correlation with computational fluid dynamics (CFD) simulations and verification of a component design upgrade for drag reduction

Manufacturing Intern, *Schlumberger* May 2011 - Nov. 2011

- Developed Standard Work Instructions for Modular Formation Dynamics Tester tool manufacturing
- Enhanced warehouse management with visualized part picking methods and aged inventory reduction

Mechanical Engineering Intern, *Schlumberger* June 2010 - Aug. 2010

- Assisted test engineers to conduct dynamic seal mechanical tests and suggested enhanced test fixture
- Prepared Test and Qualification Design Book and Dynamic Seal Chart
- Suggested new chemical and abrasion tests for better test reliability

MENTORING

NSF REU (Research Experiences for Undergraduates) Mentor, *Nanoheat Lab., Stanford University*

2 Sophomore Students from Cañada College, Redwood City, CA June 2019 - Aug. 2019

- Wrote Matlab code to control temperature measurement and recording equipment
- Calibrated thermocouples and conducted error propagation in experimental results
- Received associate degrees in 2019 and continued education to pursue bachelor's degrees at Cal. Poly. State Univ., San Luis Obispo and Oregon State Univ.

Research Mentor, *Department of Mechanical Science and Engineering, UIUC*

A Visiting Graduate Scholar from Dailan University of Technology, China Jan. 2018 - Nov. 2018

- Conducted wettability experiments on 3D-printed plate heat exchanger (PHE) replica surfaces
- Received Ph.D. in 2019

A Visiting Undergraduate Scholar from Shanghai Jiatong Univ., China June 2017 - Sept. 2017

- Wrote Engineering Equation Solver (EES) code for error analysis of refrigerant evaporation experiments in a brazed plate heat exchanger (BPHE)
- Received bachelor's degree and moved to the Univ. Minnesota in 2018 to pursue graduate degree(s)

A Master's Student in Mechanical Engineering, UIUC Jan. 2017 - May 2017

- Produced preliminary CAD model to 3D print transparent PHE replica for flow visualization
- Received master's degree in 2017

A Senior Student in Mechanical Engineering, UIUC Aug. 2016 - May 2017

- Conducted experiments with two-phase flow refrigerants in BPHE and managed the apparatus
- Received bachelor's degree in 2018

3 Junior Students in Aerospace, Computer, & Electrical Engineering, UIUC Aug. 2015 - Dec. 2015

- Built and piloted prototype unmanned aerial vehicle (UAV) units with onboard airflow sensors
- All received bachelor's degrees in 2017, and one of them got master's degree from UIUC in 2019

A Senior Student in Mechanical Engineering, UIUC Aug. 2013 - Dec. 2013

- Fabricated model hydrokinetic and wind turbines using Creo Parametric and 3D printing
- Received bachelor's degree in 2014 from UIUC and master's degree from the Univ. Michigan in 2017