

# ◆ Curriculum Vitae – Dr. Hyunjae Park ◆

## OFFICE

Department of Mechanical Engineering  
OPUS College of Engineering  
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## HOME

6942 W. Lindner Drive  
Franklin, Wisconsin 53132  
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## EDUCATION

- ◆ PhD (Dec. 1992)    Mechanical Engineering                    University of California at Los Angeles, LA, CA
- ◆ MS (Feb. 1983)    Mechanical Engineering                    Yonsei University, Seoul, Korea
- ◆ BS (Feb. 1981)    Mechanical Engineering                    Han-Yang University, Seoul, Korea

## EXPERIENCE

- ◆ Research Professor and Freshman Course Program Coordinator (Aug 2010 ~ Present)  
Department of Mechanical Engineering, Marquette University, Milwaukee, Wisconsin
- ◆ Research Professor and Director (Aug 2010 ~ Jul 2014)  
Thermofluid Science and Energy Research Center (TSERC), Department of Mechanical Engineering,  
Marquette University, Milwaukee, Wisconsin
- ◆ Research Associate Professor and Director (Aug 2001 ~ Jul 2010)  
Thermofluid Science and Energy Research Center (TSERC), Department of Mechanical Engineering,  
Marquette University, Milwaukee, Wisconsin
- ◆ Research Assistant Professor and Project Manager (Jan 1996 ~ Jul 2001)  
Center for Energy Studies (CES), Department of Mechanical Engineering, Marquette University,  
Milwaukee, Wisconsin
- ◆ Post-Doctoral Research Associate (Dec. 1992 ~ Dec. 1995)  
Department of Mechanical Engineering, Marquette University, Milwaukee, Wisconsin

## PROFESSIONAL INTERESTS

- ◆ Modeling of thermal fluid phenomena occurring in energy conversion components and systems – advanced analysis utilizing the fundamentals of thermodynamics, fluid dynamics and heat transfer, and development/refinement of current/emerging technologies through multidisciplinary research
- ◆ Industrial applications of integrated thermal-fluid fundamentals to real/practical industry engineering problems
- ◆ Research area includes
  - a. Various heat exchanging energy conversion equipment performance modeling (design and analysis),
  - b. Computational fluid dynamics (CFD) applications to energy conversion components and systems,
  - c. Optimization of energy conversion equipment and systems, and
  - d. Interdisciplinary fluid flow and heat transfer problem analysis.

## RESEARCH & ACADEMIC ACTIVITIES

- ◆ **PI** (and Co-PI) for a number of research projects sponsored by numerous industries in the fields of heat exchanger component analysis and design, energy system analysis and design, etc.
- ◆ **Development** of special industry research project programs:
  - a. Thermal fluid engineering research/design project program – • Application/integration of engineering fundamentals and knowledge to real/practical engineering problems • Development of solution algorithm, programs and analysis software tools • CFD modeling of thermal fluid phenomena of practical industry problems using a CFD package (Fluent)
  - b. On-site/on-campus technical short courses/seminar – • CFD seminar course and tailored technical short courses/seminar for industrial applications of thermal fluid fundamentals
  - c. Industry repository R&D service program – • Technical consultation for issues related to thermal fluid and energy areas of the products • Access to TSERC research facilities (CFD software, developed engineering analysis program/software and technical literatures/references) • Technical innovation team for developing state-of-the-art product technologies and their applications
- ◆ **Teaching** undergraduate and graduate courses: freshman engineering discovery courses, fundamental thermal-fluid courses (thermodynamics, fluid mechanics, heat transfer, intermediate/advanced fluid dynamics, convection heat/mass transfer, and thermal radiation heat transfer), energy conversion systems laboratory, CAD (using Siemens NX & SolidWorks), various elective courses (CFD applications to industrial thermal fluid problems, finite element method (FEM), computer-aided engineering (CAE) analysis and heat exchangers/energy system/HVAC analysis), and advanced engineering mathematics
- ◆ **External** member and supervision of BS senior design projects and Master/PhD theses

## PATENT AWARDED

- ◆ Patent No. Korea 10-2014-0052904, April 2014, Serial Air Scroll Compressor System
- ◆ Patent No. US 20130140857 A1, June 2013, Seat Air-Tube Ventilation System
- ◆ Patent No. US 6,470,835 B1, Oct. 2002, Plate-type Heat Exchanger for Exhaust Gas Heat Recovery

## ARCHIVAL PUBLICATIONS

- [1] **Park, H.**, Engineering Computing with MATLAB®, **7th<sup>th</sup> Ed.**, McGraw-Hill Companies, Inc., ISBN: 978-1-265-23539-0 (2022).
- [2] **Park, H.**, “Fostering and Establishing an Engineering Entrepreneurial Mindset through Freshman Engineering Discovery Courses Integrated with an Entrepreneurially Minded Learning (EML) Pedagogic Approach,” *Research & Information Center for Innovative Engineering Education (RICE) Issue Brief* 2020–06, Korea (2020).
- [3] **Park, H.** and Bowman, Engineering Graphics, Design and Modeling with SolidWorks 2020-2021, 1<sup>st</sup> Ed., McGraw-Hill Companies, Inc., ISBN: 978-1-264-38647-5 (2020).
- [4] **Park, H.**, “Value Creation Practice Through Open-Ended Freshman Engineering Problem-Solving and Design Challenge Activities with Entrepreneurial Mindset,” *ASEE 12<sup>th</sup> First Year Engineering Experience (FYEE) Conference*, July 26-28, Michigan State University, MI (2020).
- [5] **Park, H.**, “Assessment Analysis Results of How Freshman Engineering Students Build an Entrepreneurial Mindset through Freshman Engineering Discovery Courses,” *ASEE 11<sup>th</sup> First Year Engineering Experience (FYEE) Conference*, Session M3A, July 28-30, University Park, PA (2019).
- [6] **Park, H.**, “Engaging Freshman Engineering Students in the Entrepreneurial Mindset through Disruptive Technology Design Challenge Activity,” *ASEE 10<sup>th</sup> First Year Engineering Experience (FYEE) Conference*, ASEE Paper ID #24457, July 25-27, Glassboro, NJ (2018).
- [7] **Park, H.**, Engineering Computing with MATLAB®, **6th<sup>th</sup> Ed.**, McGraw-Hill Companies, Inc., ISBN: 978-1-265-69423-7 (2020).
  - ◆ 5<sup>th</sup> Ed., ISBN: 978-1-260-40433-3 (2018)
  - ◆ 4<sup>th</sup> Ed., ISBN: 978-1-260-09733-7 (2017)
  - ◆ 3<sup>rd</sup> Ed., ISBN: 978-1-259-90877-4 (2016)
  - ◆ 2<sup>nd</sup> Ed., ISBN: 978-1-259-20929-1 (2014)
  - ◆ 1<sup>st</sup> Ed., ISBN: 0-07-763938-3 (2012)

- [8] **Park, H.**, Bowman, A. and Kim K., Engineering Graphics, Design and Modeling with UGS NX 12.0, 8<sup>th</sup> Ed., McGraw-Hill Companies, Inc., ISBN: 978-1-260-58198-0 (2018).  
 ♦ 7<sup>th</sup> Ed., ISBN: 978-1-259-67264-4 (2016) ♦ 6<sup>th</sup> Ed., ISBN: 978-1-259-33643-0 (2014)  
 ♦ 5<sup>th</sup> Ed., ISBN: 0-07-353143-X (2013) ♦ 4<sup>th</sup> Ed., ISBN: 0-07-340900-6 (2012)  
 ♦ 3<sup>rd</sup> Ed., ISBN: 0-07-804349-2 (2011) ♦ 2<sup>nd</sup> Ed., ISBN: 0-07-804227-5 (2010)  
 ♦ 1<sup>st</sup> Ed., ISBN: 0-07-804094-9 (2009)
- [9] **Park, H.**, “Fostering and Establishing an Engineering Entrepreneurial Mindset through Freshman Engineering Discovery Courses Integrated with an Entrepreneurially Minded Learning (EML) Pedagogic Approach,” ASEE 9<sup>th</sup> First Year Engineering Experience (FYEE) Conference, ASEE Paper ID #20942, August 6-8, Daytona Beach, FL (2017).
- [10] **Park, H.** and Kim, K., “Implementation of an Entrepreneurially Minded Learning (EML) in Freshman Engineering Discovery Courses and Its Primary Outcomes,” 2016 World Engineering Education Forum (WEEF) and Global Engineering Dean’s Council (GEDC), November 7-10, Seoul, Korea (2016).
- [11] **Park, H.**, “Fostering an Engineering Entrepreneurial Mindset through the Engineering Problem-Solving Module in the Freshman Engineering Discovery Course,” ASEE 8<sup>th</sup> First Year Engineering Experience (FYEE) Conference, Session M1C-1, July 31-August 2, Columbus, OH (2016).
- [12] **Park, H.** and Perez, C., “Math-Proficiency Program for New Engineering Students,” ASEE 8<sup>th</sup> First Year Engineering Experience (FYEE) Conference, Session T3C, July 31-August 2, Columbus, OH (2016).
- [13] **Park, H.** and Kim, K., “Development of Freshman Engineering Discovery Courses Integrated with Entrepreneurially Minded Learning (EML),” 2015 World Engineering Education Forum (WEEF) and International Conference on Interactive Collaborative Learning (ICL), September 20-24, Florence, Italy (2015).
- [14] **Park, H.**, “Building an Engineering Entrepreneurial Mindset through Freshman Engineering Design Challenges,” ASEE 7<sup>th</sup> First Year Engineering Experience (FYEE) Conference, Session T1B, August 3-4, Roanoke, VA (2015).
- [15] **Park, H.**, “Freshman Engineering Discovery Courses at Marquette University – College of Engineering,” ASEE 6<sup>th</sup> First Year Engineering Experience (FYEE) Conference, Session F1A, College Station, TX (2014).
- [16] Cariapa, V., **Park, H.** and Cheng, C., “Reliability analysis of mass finishing processes,” Transactions of the NAMRI/SME, Volume 38 (2010).
- [17] Craig, K. and **Park, H.**, “Multidisciplinary freshman engineering program,” IEEE Conference – Transforming Engineering Education: Creating Interdisciplinary Skills for Complex Global Environments, Ireland, March (2010).
- [18] Cariapa, V., **Park, H.**, Kim, J., Cheng, C., and Evaristo, A.E.G., “Effect of Abrasive content in media wear and material removal rate in centrifugal disk mass finishing machine,” Transactions of the NAMRC, v36, 341-348 (2008).
- [19] Cariapa, V., **Park, H.**, Kim, J., Cheng, C., and Evaristo, A.E.G., “Development of a metal removal model using spherical ceramic media in a centrifugal disk mass finishing machine,” International Journal of Advanced Manufacturing Technology, 39: 92-106 (2008).
- [20] Heat Transfer Calculations by Myer Kutz, McGraw- Hill Companies, Inc., ISBN: 0-07-141041-4: Chapter 41, Entitled as “Thermal Analysis of Convectively Cooled Heat-Dissipating Components on Printed Circuit Boards” prepared by **Hyunjae Park** (2006).
- [21] Loughrin, C., **Park, H.** and Weber, R., “Development of Analysis Algorithm and Computational Methodology for the Evaluation of Non-uniform Energy Conversion System Performance (Part I: Component Analysis Module),” ASME IMECE2006-14960 (2006).
- [22] Loughrin, C., **Park, H.** and Weber, R., “Development of Analysis Algorithm and Computational Methodology for the Evaluation of Non-uniform Energy Conversion System Performance (Part II: System Connectivity),” ASME IMECE2006-14965 (2006).
- [23] Shin, K, **Park, H.**, Kim, J. and Kim, K., “Mathematical and Experimental Investigation of Thermal Response of an Automobile Passenger with a Ventilated Seat,” ASME IMECE2006-14770 (2006).
- [24] Bowman, A. and **Park, H.**, “CFD Investigation of Developing and Redeveloping Laminar Flow and Heat Transfer Characteristics in Coiled Tube Systems for Constant Wall Temperature Heating and Cooling (Part I: Toroidal and Helical Configurations),” ASME IMECE2006-15570 (2006).
- [25] Bowman, A. and **Park, H.**, “CFD Investigation of Developing and Redeveloping Laminar Flow and Heat Transfer Characteristics in Coiled Tube Systems for Constant Wall Temperature Heating and Cooling (Part II: Spiral Configuration),” ASME IMECE2006-15572 (2006).

- [26] **Park, H.**, Bowman, A., Dake, T., Kicinski, K. and Jaeger, D., "Investigation of Thermal Performance Characteristics of a Motorcycle Exhaust-Pipe System," 9<sup>th</sup> Joint AIAA/ASME Thermophysics and Heat Transfer Conferences, AIAA-2006-2924 (2006).
- [27] Shin, K., **Park, H.** and Kim, K., "Evaluation of Automobile Passenger Thermal Comfort Response Due to Seat Cooled by Forced Convection Heat Transfer Mode," 9<sup>th</sup> Joint AIAA/ASME Thermophysics and Heat Transfer Conferences, AIAA-2006-2923 (2006).
- [28] **Park, H.** and Bowman, A., "Governing Equations Used in Coiled Tube Systems, Part I: Development of Standard/General Forms," 9<sup>th</sup> Joint AIAA/ASME Thermophysics and Heat Transfer Conferences, AIAA-2006-3617 (2006).
- [29] **Park, H.** and Bowman, A., "Governing Equations Used in Coiled Tube Systems, Part II: Order-of-Magnitude Analysis of Spiral Coil System," 9<sup>th</sup> Joint AIAA/ASME Thermophysics and Heat Transfer Conferences, AIAA-2006-3616 (2006).
- [30] Bowman, A. and **Park, H.**, "Investigation and Development of Proposed General Pressure Drop and Heat Transfer Correlations for Laminar Flow in a Toroidal Coiled Tube System," ASME IMECE 2004-59872 (2004).
- [31] Bowman, A. and **Park, H.**, "CFD Study on Laminar Flow Pressure Drop and Heat Transfer Characteristics in Toroidal and Spiral Coil Systems," ASME IMECE 2004-59879 (2004).
- [32] **Park, H.** and Bowman, A., "Development of Plate-type Heat Exchanger for Exhaust Gas Heat Recovery," ASME IMECE 2003-42671 (2003).
- [33] Bowman, A. and **Park, H.**, "Development of Generalized Correlations for the Pressure Drop and Heat Transfer Applied in Helically Coiled Tube System," ASME IMECE 2003-42672 (2003).
- [34] Bowman A., **Park, H.**, Hayes, B., Rinehart, M., Raether S. and Farrell M., "Investigation and Development of Condensation Heat Transfer for Straight and Helically Coiled Tubes," ASME IMECE 2002-32900 (2002).
- [35] **Park, H.**, Bowman A., Stansfield, T., Huijbregtse, B and Wilkinson, S., "Effect of Boiler Feedwater Inlet Locations on the Water Circulation Characteristics in a Firetube Boiler with the Non-Symmetrically Arranged Tube Passes 3 and 4," ASME IMECE 2002-33043 (2002).
- [36] **Park, H.**, Nigro, N., Gollhardt N. and Lee, P., "Development and Integration of a Semi-Analytical PCB Thermal Design Technique with an Infrared Thermal Imaging System," ASME IMECE 2001/AES-23600 (2001).
- [37] **Park, H.**, Bowman, A., Stansfield, T., Huijbregtse, B., Wilkinson S. and Ayala, W., "Prediction of Water Circulation Characteristics in a 4-Pass Firetube Boiler with the Non-Symmetric Arrangement of Tube Passes 3 and 4," ASME IMECE 2001/AES-23603 (2001).
- [38] Hayes, B., **Park, H.**, Raether, S. and Farrell, M., "Investigation of Turbulent Forced Convection Heat Transfer and Pressure Drop Correlations for a Helically Coiled Tube," 35<sup>th</sup> National Heat Transfer Conference, NHTC2001-20210 (2001).
- [39] **Park, H.**, Richardson, D., Stansfield, T., Tompkins G. and Molvie, P., "Investigation and Evaluation of Steam Hammer Occurring During Boiler Blowdown Process," ASME AES-Vol. 39, p. 523 (1999).
- [40] **Park, H.**, Nigro, N., Elkouh, A., Gollhardt, N. and Lee, P., "Estimation of Effective Radiation Heat Loss from Heaters on Two Parallel PCBs and Its Effect on Heater Wall Temperature," ASME 99-IMECE/EEP-1 (1999).
- [41] Molvie, P., Tompkins, G., Stansfield, T. and **Park, H.**, "Water Column and Level Device Blowdown: A Word of Caution," National Board Bulletin, Vol. 54, No. 4, p. 3 (1999).
- [42] **Park, H.**, Nigro, N., Elkouh, A., Gollhardt, N. and Lee, N., "Approximate Thermal Analysis of Printed Circuit Boards Cooled By Laminar Natural Convection," ASME 98-WA/EEP-20 (1998).
- [43] **Park, H.**, Nigro, N., Elkouh, A., Gollhardt, N. and Lee, P., "Effect of Design Parameters on Thermal Behavior of Printed Circuit Boards Cooled By Uni-Directional Flow," ASME 98-WA/EEP-21 (1998).
- [44] **Park, H.**, Nigro, N., Elkouh, A., Gollhardt, N. and Lee, P., "Guidelines for Preliminary Thermal Design of Convectively Cooled Printed Circuit Boards," ASME HTD-Vol. 351, Volume 1, p. 315 (1997).
- [45] **Park, H.** and Valentino, M., "Parametric Study of A Firetube Boiler Performance," ASME HTD-Vol. 320 (PID-Vol. 1), p. 29 (1995).
- [46] **Park, H.**, and Valentino, M., "Determination of IFGR Rate and Fuel Energy Consumption Due To Boiler Purging," ASME AES-Vol. 35, p. 323 (1995).
- [47] **Park, H.** and Valentino, M. "Effect of Thermo-Physical Parameters on Firetube Boiler Performance," Proceedings of the ECOS'95 (International Conference of Efficiency, Costs, Optimization, Simulation and Environmental Impact of Energy Systems, Istanbul, Turkey), Vol. 1 (B1-163), p. 321 (1995).

- [48] **Park, H.** and M. Valentino, “A Model of Heat Transfer and Exergy Consumption in A Firetube Boiler Furnace,” *Proceedings of the ECOS' 95 (International Conference of Efficiency, Costs, Optimization, Simulation and Environmental Impact of Energy Systems*, Istanbul, Turkey), Vol. 1 (B2-162), p. 353 (1995).
- [49] **Park, H.**, Dhir, V.K., Kastenber, W.E., “Effect of External Cooling on the Thermal Behavior of A Boiling Water Reactor Vessel Lower Head,” *Journal of Nuclear Technology*, Vol. 108, pp. 288 (1994).
- [50] Paulus, D. Gaggioli, R., **Park, H.** and Dunbar, W.R., “Development of Personal Computer Software for Energy System Simulation,” *ASME AES-Vol. 33*, p. 177 (1994).
- [51] **Park, H.** and Dhir, V.K., “Effect of Outside Cooling on the Thermal Behavior of A PWR Vessel Lower Head,” *Journal of Nuclear Technology*, Vol. 100, No. 3, pp. 331 (1992).
- [52] **Park, H.**, Lee, J., Dhir, V.K. and Mal, A., “Thermal Stresses and Creep Rupture Analysis for a PWR Vessel Lower Head During External Flooding,” *ANS HTV-Vol. 6*, p. 376 (1992).
- [53] **Park, H.** and Dhir, V.K., “Effect of External Flooding on Retention of Core Material in A BWR Lower Head,” *the 27th Proceedings of Nuclear Thermal Hydraulics*, p 315 (1991).
- [54] **Park, H.** and V.K. Dhir, “Steady State Analysis of External Cooling of A PWR Vessel Lower Head,” *AICHE Symposium Series*, No. 283, Vol. 87, p 1 (1991).
- [55] Kastenber, W.E., **Park, H.**, et al., “A Framework for the Assessment of Severe Accident Management Strategies,” *the 19th Water Reactor Safety Information Meeting*, October 1991.
- [56] Kastenber, W.E., **Park, H.**, et al., Proceedings of A Workshop on Severe Accident Management for Pressurized Water Reactors (PWR's), Los Angeles, California, July 1991.
- [57] Kastenber, W.E., **Park, H.**, et al., Proceedings of A Workshop on Severe Accident Management for Boiling Water Reactors (BWR's), Los Angeles, California, July 1991.
- [58] **Park, H.** and Choi, I.K., “Heat Transfer and Flow Pattern for a Circular Tube Placed in the Injected Flow Between Two Tubes”, *Yonsei Engineering Report* (1983).

## TECHNICAL RESEARCH PROJECT AND CONSULTING WORKS

\*PI (Principal Investigator) & Co-PI (Co-Principal Investigator)

- [1] “*Scroll Air Compressor Design & Development*”, Aspen Compressor, LLC, Marlborough, MA, **2016-18**.
- [2] “*Thermal Insulation Effect of Aerogel Insulation Mattress*,” Aerogel Korea, Seoul, Korea, **2015-16**.
- [3] “*Design and Development of Aerogel Insulation Mattress Forming Device*,” Aerogel Korea, Seoul, Korea, **2014-15**.
- [4] “*Research and Development of Automobile Electric Scroll Compressor*,” eComp, Inc., Seoul, Korea, **2013-14**.
- [5] “*Automobile A/C Scroll-Type Compressor Development*,” KC Corp., Kim-Hae, Korea, **2012**.
- [6] “*Automobile Ventilation Seat System Design and Development – Spiral-Air-Tube System*,” Kwangjin Wintech Co., LTD, Pusan, Korea, **2011-12**.
- [7] “*Anguil Directed Fired Thermal Oxidizer (DFTO) System Performance Analysis Software Development*,” Anguil Environmental Systems, Inc., Milwaukee, Wisconsin, **2009-10**.
- [8] “*Turbogenix Power Generation Cycle Performance Analysis*,” TurboGenix Inc., Brooksville, Florida, **2008**.
- [9] “*Analysis of Anguil Power Generation Cycle*,” Anguil Environmental Systems, Inc., Milwaukee, Wisconsin, **2007**.
- [10] “*Business Management System – Front-Office and Back-Office Software Development*,” Incomserv. Inc., Oconomowoc, Wisconsin, **2002-07**.
- [11] “*Development of Pre-Heat’s Heat Exchangers Sizing/Selection Software (Project Type I – Phase I)*,” Pre-Heat, Inc., Oostburg, Wisconsin, **2006**.
- [12] “*Harley-Davidson Exhaust-Pipe System Analysis - Development of System Heat Flow and Thermal Performance Analysis*,” Harley-Davidson Motor Company, Wauwatosa, Wisconsin, **2004-05**.
- [13] “*Sellars’ Paper-Sheet Cooling/Heating System – Performance Analysis*,”\_Sellars Wipers & Sorbents, Milwaukee, Wisconsin, **2005**.
- [14] “*Information Support System & Sales Management System Software Development*,” Creative Earthscapes Inc., North Lake, Wisconsin, **2003-04**.

- [15] “*Mobile Snow-Melting Heat Exchanger Design and Analysis*,” Ponder Burner Company, Portland, Oregon, **2003**.
- [16] “*CFD Modeling of ORBITEC’s Vortex Combustor*,”\_ORBITEC Space Center, Madison, Wisconsin, **2003**.
- [17] “*Sample Coolers and Spiral Tube Heat Exchangers – Design Selection Software Development*,” Sentry Equipment Corp., Oconomowoc, Wisconsin, **1999-2003**.
- [18] “*CFD Modeling of CB Boiler System*,” Cleaver-Brooks Company, Milwaukee, Wisconsin, **2002**.
- [19] “*CB Boiler System Research and Development (Phase II)*,” Cleaver-Brooks Company, Milwaukee, Wisconsin, **1997-2002**.
- [20] “*Sample Coolers and Spiral Tube Heat Exchanger Analysis and Development*,” Sentry Equipment Corporation, Oconomowoc, Wisconsin, **2000-02**.
- [21] “*Atmospheric Burner Design and Development – Experimental Design and Data Analysis*,” AO Smith Corp., Milwaukee, Wisconsin, **2000-01**.
- [22] “*Johnson’s Candle-Jar System Research and Development*,” S.C. Johnson & Son, Inc., Racine, Wisconsin, **1999-2000**.
- [23] “*Thermofluid Modeling of Anguil Catalytic Oxidizer Systems*,” Anguil Environmental Systems, Inc. Milwaukee, Wisconsin, **1998-99**.
- [24] “*Thermal Management of PCB Cooling – Development of PCB Design Guideline Software*” & “*Improvement of PCB Thermal Design Techniques*,”\_Rockwell Automation Allen-Bradley Company, Milwaukee, Wisconsin, **1997-99**.
- [25] “*Plate-type Heat Exchanger Analysis Model Program Development*,” Modine Manufacturing Co., Racine, Wisconsin, **1995-98**.
- [26] “*Energy System Evaluation (Module) Software Development*,” Wisconsin Electric Power Company (WEPCO) – We Energies, Milwaukee, Wisconsin, **1994-97**.
- [27] “*CB Boiler System Research and Development (Phase I)*,” Cleaver-Brooks Company, Milwaukee, Wisconsin, **1993-97**.

## **COURSE INSTRUCTION** (all at Marquette University)

### **(Undergraduate Courses)**

- [1] Freshman Engineering Discovery 1 & 2
- [2] Engineering Computing with MATALB
- [3] Graphical Tools for Engineering Design Communications with Computer-Aided Design (CAD)
- [4] Engineering Thermodynamics
- [5] Fluid Mechanics
- [6] Fundamentals of Heat Transfer
- [7] Energy Conversion/System Process Lab
- [8] Computer-Aided Engineering (CAE) Analysis
- [9] Finite Element Method (FEM)
- [10] Energy Conversion Systems – HEX & HVAC Analysis
- [11] Intermediate Fluid Dynamics
- [12] CFD Modeling & Application / HEXs Design & Analysis

### **(Graduate Courses)**

- [1] Advanced Engineering Mathematics/Analysis 1 & 2
- [2] Advanced Fluid Dynamics
- [3] Energy Conversion Systems – HEX and HVAC Analysis
- [4] Thermal Radiation Heat Transfer
- [5] Convective Heat/Mass Transfer

- [6] CFD Modeling & Application / HEXs Design and Analysis
- [7] Independent Study/Research for Selected Topics

### **(Courses Developed)**

- [1] Freshman Engineering Discovery Courses – (i) Engineering Problem Solving Activity Development, (ii) CAD Team Design Project Development, (iii) Engineering Design Process and Design Challenges/Projects Development
- [2] Heat/Energy System Analysis – (i) Heat Exchangers and HVAC System Analysis, (ii) Student Term Project with Real Industrial Problems, (iii) CFD (FLUENT) Application to Industrial Thermofluid Problems
- [3] Energy Conversion Lab Development – (i) Friction Factor and Heat Exchanger Experiments Development, (ii) Data Acquisition System (DAS) Setup, (iii) Lab Manual Revision
- [4] CFD Modeling Module Courses – (i) Thermofluid Fundamentals (*Module 1*), (ii) Conservation Equations & Analytical Solutions (*Module 2*), (iii) Basic Numerical Schemes & Solutions – CFD with Fluent (*Module 3*)

## **THESIS DIRECTION**

### **(Completed Theses) – Committee Chair**

- [1] Gu, R. (MS, 2016), “*Modeling and Investigation of Refrigeration System Performance with Two-Phase Fluid Injection in a Scroll Compressor.*”
- [2] Bowman, A. (PhD, 2007), “*Investigation of Fluid Flow and Heat Transfer Characteristics in Coiled Tube Systems.*”
- [3] Shin, K. (PhD, 2006), “*Investigation of Thermal Response of An Automobile Passenger With a Ventilated Seat.*”
- [4] Fang, D. (MS, 2004) “*Computational Fluid Dynamics (CFD) Study of NASA’s Cold-Wall Swirl-Driven Rocket Combustion Chamber.*”
- [5] Valentino, M. (MS, 2003), “*Determination of Induced Flue Gas Recirculation (IFGR) Rate in a Firetube Boiler and Fuel Energy Consumption Rate due to Boiler Purging.*”
- [6] Garski, D. (MS, 2003), “*Thermodynamic Analysis of a Transcritical CO<sub>2</sub> Heat Pump Cycle for Water Heating.*”
- [7] Hayes, B. (MS, 2001), “*Investigation of Heat Transfer and Pressure Drop Characteristics in Helically Coiled Tube.*”
- [8] Gassis, R. (MS, 1999), “*Thermal Analysis of Sealed Enclosure PCB System.*”
- [9] Mao, L. (MS, 1997), “*Effect of Upstream/Downstream Heat Conduction on the Thermal Performance of a Heating Components on a PCB.*”
- [10] Zurowski, R. (MS, 1996), “*Energy Equipment Performance Correlations.*”

### **(Completed Theses) – Committee Member**

- [1] Helminiak, N. (MS 2017), “*Construction and Characterization of a Single Stage Dual Diaphragm Gas Gun.*”
- [2] Bak, H.J. (MS, 2014), “*Thermal Characterization of Liquid Samples with Three-Dimensional On-Chip Micro Calorimeter.*”
- [3] Domfang, K.C. (PhD, 2013), “*Analysis of Laminated Anisotropic Plates and Shells via a Modified Complementary Energy Principle Approach.*”
- [4] Jordan, K. (PhD, 2011), “*Direct Numeric Simulation of Shock Wave Structures without the Use of Artificial Viscosity.*”
- [5] Valensa, J. (MS, 2009), “*Development of An Optimized Methodology for Simulation of Heterogeneous Catalytic Combustion on Heat Exchange Surface.*”
- [6] Xue, L. (PhD, 2006), “*A Comprehensive Examination of Cylindrical Shell Intersections.*”
- [7] Fang, D. (MS, 2004) “*Computational Fluid Dynamics (CFD) Study of NASA’s Cold-Wall Swirl-Driven Rocket Combustion Chamber.*”
- [8] Chibli, H. (MS, 2003), “*Higher Order Combustion Instability Corrections in Solid Rocket Motors.*”
- [9] Vyas, A. (PhD, 2003), “*Injection and Swirl Driven Flow Fields in Solid and Liquid Rocket Motors.*”
- [10] Jankowski, T. (MS, 2001), “*Laminar Oscillatory Flows in Porous Tubes and Channels with Arbitrary Wall Suction.*”
- [11] Wang, B. (MS, 2001), “*Potential Improvement of Hot Water and Low Pressure Steam Systems.*”
- [12] Bowman, A. (MS, 2001), “*Development of an Optimal Fan Selection Procedure Based On Modified Dimensions Performance Correlations.*”

- [13] Paulus, D. (PhD, 2000), “*Second Law Analysis in Modeling, Design and Optimization.*”
- [14] Moody, S. (MS, 1997), “*Analysis and Optimization of Solid Oxide Fuel Cell Cogeneration Systems.*”
- [15] Paulus, D. (MS, 1995), “*Personal Computer Simulation of Energy Systems.*”

### **(Supervising BS Senior Design Projects)**

- [1] “*Designing & Developing Oil Spill Clean-Up Device,*” by Zach S, Vadym S, Miguel M, Lance V, Steven S. (2021-2022).
- [2] “*Designing Briggs and Stratton Pressure Washer High Pressure Chemical Injection System,*” by Evan B, Andrew F, Zachary M, Ian M, Mackenzie N. (2018-2019).
- [3] “*Developing (Designing & Testing) Scroll-Type Air Expander (Mini Turbine),*” by Hughes, M., Younger, G., Burke, T., Stemper, D., Tripi, A. (2017-2018).
- [4] “*Engine Intake Airflow Swirl/Tuning Actuator,*” by Maloney, R., Deutschmann, Z., Mikkelsen, M., Talkington, T.J., (2016-2017).
- [5] “*SAE Aero West Micro-Class Competition,*” by Blankenheim, D., Meus, S., Neville, A., Wilke, A., (2010-2011).
- [6] “*Bio-Fuel Stove Development,*” by Condon, M., Hartwig, M., Hanrahn, M., Bridges, T., (2009-2010).
- [7] “*Low Cost Multi-Fuel Stove for Developing Countries,*” by Weber, A., Doyle, M., Falendysz, N., Popowski, S., Nahn, R., Nelson, K., (2008-2009).
- [8] “*SAE Aero Design (Airlift Wing),*” by Fitzpatrick, J., Lane, M., Reiser, K., Wojno, D., Meindl, W., Shafer, J., (2007-2008).
- [9] “*SLALOM Water Ski Improvement Project,*” by Kennedy, J., Novak, T., Schroeder, K., (2007-2008).

## **ACTIVITIES**

### **(Professional)**

- ◆ Member, the American Society of Mechanical Engineers (ASME) (Oct. 1994 ~ Present)
- ◆ Guest Editor & Reviewer, Journal of Pressure Vessel Technology (JPVT) (Mar. 2006 ~ May 2013)
- ◆ Reviewer, International Journal of Heat Exchangers (IJHE) (Jan. 2005 ~ Present)
- ◆ Reviewer, Journal of Electronic Packaging (JEP) (Jan. 2003 ~ Present)

### **(Cultural)**

- ◆ Director of Board, the Korean American Association of Milwaukee (Jan. 2017 ~ Dec. 2018)
- ◆ Board Member, the Korean American Association of Milwaukee (Jan. 1996 ~ Present)
- ◆ Vice President, the Korean American Association of Milwaukee (Jan. 2001 ~ Dec. 2004)
- ◆ Choir, Member & Coordinator, the Life Creek Church (Korean Church of Milwaukee) (Jan. 1995 ~ Present)
- ◆ Member, Sunday School Committee, the Life Creek Church (Korean Church of Milwaukee) (Aug. 1997 ~ Dec. 2004)
- ◆ Principal, the Korean Language and Cultural School of Milwaukee (Aug. 1995 ~ Dec. 2004)