

Professional Vita (updated December 2018)

ISSAM MUDAWAR
(Formerly Issam Mudawwar)

Purdue University
School of Mechanical Engineering
585 Purdue Mall
West Lafayette, IN 47907-2088
Tel: (765) 494-5705
Fax: (765) 494-0539
E-mail: mudawar@ecn.purdue.edu
Web Pages: <https://engineering.purdue.edu/BTPFL>

PERSONAL: American Citizen
Wife: Jane Ausman-Mudawar, daughter: Alexine

EDUCATION: Massachusetts Institute of Technology - Cambridge, Massachusetts
1980-1984 Ph.D. in Mechanical Engineering, with minor in Management received February 1984, thesis entitled "Boiling Heat Transfer in Rotating channels with Reference to Gas Turbine Blade Cooling"
1978-1980 M.S. in Mechanical Engineering received May 1980, thesis entitled "Transverse Waves in MHD Slag Flows"

EXPERIENCE:
2015-present Betty Ruth and Milton B. Hollander Family Professor of Mechanical Engineering
2014-2016 Chairman, Heat Transfer Area, Purdue University
2000-2001 Chairman, Heat Transfer Area, Purdue University
1993-present Professor of Mechanical Engineering, Purdue University, West Lafayette, Indiana
1992-present President, Mudawar Thermal Systems Inc., West Lafayette, Indiana
1989-1993 Associate Professor of Mechanical Engineering, Purdue University
1984-1989 Assistant Professor Mechanical Engineering, Purdue University
1984-present Founder and Director of the Purdue University Boiling and Two-Phase Flow Laboratory (BTPFL) and Purdue University International Electronic Cooling Alliance (PUIECA)

CITATION RECORD:
ISI: Thomson Reuters Highly Cited Researcher, 2015
ISI: Included in Thomson Reuters list of "The World's Most Influential Scientific Minds 2015"
Google Scholar: 18,563 citations, h-index: 79
Web of Science (ISI): 11,035 citations, h-index: 60

PROFESSIONAL BACKGROUND:

Since joining Purdue University in 1984, Prof. Issam Mudawar founded both the Boiling and Two-Phase Flow Laboratory (BTPFL) and the Purdue University International Electronic Cooling Alliance (PUIECA). He also served as co-principal investigator for both the Rolls Royce Purdue University Center in High Mach Propulsion and the Hydrogen Storage Laboratory. He has supervised over 65 Ph.D. and M.S. students and Visiting Scholars, and written 4 handbooks, 190 archival journal papers, 9 book chapters, and numerous conference papers and technical

reports. He has made significant contributions to ASME and other engineering societies in the capacity of keynote speaker, author, reviewer and conference session chair.

Prof. Mudawar is internationally recognized for his theoretical and experimental research on phase change mechanisms and applications in energy, intelligent materials processing, space and electronics thermal management. Following are brief descriptions of his contributions in each of these areas.

Theoretical Two-Phase Research: His theoretical research encompasses virtually every aspect of phase change. Examples include theory of initiation of nucleate boiling, critical heat flux (CHF), minimum film boiling point, contact angle, turbulence in the vicinity of moving interfaces, pool boiling, wavy falling films, thin film condensation, heating, evaporation and boiling, channel flow boiling, flow boiling on curved surfaces, boiling in rotating systems, droplet impact dynamics, sprays, jets, and enhanced surfaces. He is also credited for authoring the first comprehensive methodology for analysis of boiling in micro-channels. He has developed customized experimental methods for these studies including simultaneous use of laser Doppler velocimetry (LDV) and parallel-wire conductance probes, micro-particle image velocimetry (micro-PIV), photomicrography, high speed video imaging, and specialized microfabrication techniques and carbon nanotube surface coating.

Energy Research: Prof. Mudawar's energy research encompasses numerous energy systems and applications, including magnetohydrodynamic energy conversion, liquid-cooled industrial gas turbine engines, high efficiency gas turbine power cycles, vertical evaporators, rotating evaporators, vertical condensers, desalination, particle accelerators, metal hydride hydrogen fuel cell storage systems, energy efficiency improvement and reduced water utilization in metal processing, and nuclear power generation. Published in 1999, his theoretical models and consolidated databases in the three-volume handbook "Critical Heat Flux (CHF) for Water in Tubes" is used by many nuclear reactor manufacturers to predict upper safety limits for reactor operation.

Electronics Thermal Management: launched in 1984, Prof. Mudawar's electronics cooling research center quickly became the nation's first laboratory dedicated to the study of very-high-flux and phase change thermal management of electronics using such schemes as thermosyphons, semi-passive falling film cooling, channel-flow boiling, micro-channel boiling, micro-channel condensation, jet impingement, spray cooling, and vapor compression loops. He has played a pioneering national and international role in the development of thermal solutions for supercomputers, servers, laptops, chip testing, hybrid vehicle power electronics, and x-ray medical devices and systems.

Space Research: Prof. Mudawar has played a critical role in NASA's shift from present mostly single-phase liquid-cooled thermal management and control systems for space missions to two-phase thermal management. These efforts are aimed at capitalizing upon the orders-of-magnitude enhancement that is possible with boiling and condensing flows compared to their single-phase counterparts. Prof. Mudawar has performed extensive microgravity flow boiling experiments in parabolic flight and developed the first theoretical model for flow boiling critical heat flux in microgravity. He is presently partnering with the NASA Glenn Research Center on the design of a flow boiling and condensation facility for the International Space Station (ISS), and on the implementation of phase change processes in such subsystems as space power generation, cabin temperature control, waste management, and regenerative fuel cells. In a related study, he developed a theoretical model for successful startup of capillary pumped loops used for thermal management in many types of satellites and space systems.

Intelligent Materials Processing: Since the late 1980s, Prof. Mudawar has pursued several studies aimed at developing an intelligent heat treating technology for complex-shaped metal alloy parts that would eliminate altogether the trial-and-error approach prevalent in the industry today. Using cooling and metallurgical transformation models, he developed a CAD-based pilot facility where the most critical phase of heat treating, the quench, is optimized by configuring water cooling sprays in response to the part's shape. This technology has been shown to greatly increase part strength and hardness, enhance corrosion resistance, reduce residual stresses, warping, and cracking, greatly increased productivity, and virtually eliminate scrap. Another important aspect of this technology is the development of new non-contact temperature measurement techniques and algorithms.

Prof. Mudawar's research contributions and innovations are highly acknowledged worldwide. His research contributions earned him the title of Fellow of ASME in 1997. He is also a Senior Member of AIAA and Member of both ASM and ASGSR. One of his key research accomplishments is the attainment of the world's highest phase-change cooling heat flux, over 27,000 W/cm², using innovative micro-heat-exchanger technology. In 1995 and 1996, "Business Week" featured Prof. Mudawar's breakthroughs under "Developments to Watch" in three separate issues during a single 10-month period. He has received numerous awards, including best paper awards at the 1988 National Heat Transfer Conference, 1992 ASME/JSME Joint Conference on Electronic Packaging, and ITherm

2008. He also received the ASME Journal of Electronic Packaging Outstanding Paper Award for 1995, in addition to numerous awards and recognitions from ASME, AIAA, IEEE, JSME, ASM, US Navy, US Missile Defense Agency, and Rolls Royce. In 2013, he received the American Society for Gravitational and Space Research (ASGSR) Founder's Award, the ASME Heat Transfer Memorial Award in Science Category, and 75th Anniversary Medal of the ASME Heat Transfer Division. Many of his publications have been recognized for top international citation rankings.

Prof. Mudawar is also highly committed to education, evidenced by the many awards he received at Purdue for teaching and both curriculum and instructional heat transfer laboratory development, as well as dedicated service to minority students and organizations.

HONORS AND AWARDS:

- Included in the Thomson Reuters list of "The World's Most Influential Scientific Minds 2015."
- The Betty Ruth and Milton B. Hollander Family Professor of Mechanical Engineering, 2015.
- Thomson Reuters Highly Cited Researcher, 2015.
- "Professor Issam Mudawar on his 60th Birthday," article co-authored by leading heat transfer researchers and former students, *International Journal of Heat and Mass Transfer*, Vol. 89, pp. A1-A3, 2015.
- Keynote Speaker, "Criteria for Negating Influence of Gravity on Flow Boiling Critical Heat Flux in Space Systems," 9th International Conference on Two-Phase Systems for Space and Ground Applications, Baltimore, MD, September 22-26, 2014.
- 2013 American Society for Gravitational and Space Research (ASGSR) Founder's Award. This award is "the highest honor given by ASGSR to a member of the Society for distinguished scientific contributions to and leadership in the field of gravitational research."
- 2013 Heat Transfer Memorial Award in Science Category for pioneering theoretical and experimental research on phase change mechanisms and applications in energy, materials processing, aerospace propulsion and thermal management, and electronics cooling, American Society of Mechanical Engineers (ASME) Heat Transfer Division (HTD).
- 75th Anniversary Medal of the American Society of Mechanical Engineers (ASME) Heat Transfer Division (HTD), 2013.
- Invited paper, "Recent Advances in High-Flux, Two-Phase Thermal Management," *ASME Journal of Thermal Science and Engineering Applications*, special issue celebrating 75th anniversary of the establishment of the ASME Heat Transfer Division, Vol. 5, pp. 021012-1-15, 2013.
- Faculty Entrepreneurs Innovators Hall of Fame Award, Purdue Office of Technology Commercialization, 2012-2013.
- Certificate of Recognition in testimony of distinguished achievement of research in thermal engineering and service to engineering profession, The Japanese Society of Mechanical Engineers (JSME) and the American Society of Mechanical Engineers (ASME), 2011.
- Keynote Speaker, "Two-Phase Micro-Channel Heat Sinks: Theory, Applications and Limitations," ASME/JSME 2011 8th Thermal Engineering Joint Conference, Honolulu, Hawaii, March 2011.
- Certificate of Recognition for 25 years of sustained contributions to the advancement of the arts, sciences and technology of aeronautics and astronautics, American Institute of Aeronautics and Astronautics (AIAA).
- Certificate of Recognition for 25 years of Service, American Society of Mechanical Engineers (ASME).
- Certificate of Recognition, Department of the Navy, Office of Naval Research, Small Business Innovation Program, June 7, 2010.
- The most cited article for the years 2005-2008, *International Journal of Heat and Mass Transfer*, for the paper "Two-Phase Flow in High-Heat-Flux Micro-Channel Heat Sink for Refrigeration Cooling Applications: Part I – Pressure Drop Characteristics," by J. Lee and I. Mudawar, Vol. 48, pp. 928-940, 2005.

- The second most cited article for the years 2005-2008, International Journal of Heat and Mass Transfer, for the paper "Two-Phase Flow in High-Heat-Flux Micro-Channel Heat Sink for Refrigeration Cooling Applications: Part I – Heat Transfer Characteristics," by J. Lee and I. Mudawar, Vol. 48, pp. 941-955, 2005.
- Rolls-Royce Milestone Award for design of air-to-fuel heat exchanger for high Mach aircraft turbine engines, LibertyWorks, North American Technologies operations of Rolls-Royce, February 2009.
- Best Paper Award in Thermal Management, for the paper "Single-Phase and Two-Phase Hybrid Cooling Schemes for High-Heat-Flux Thermal Management of Defense Electronics," by M. Sung and I. Mudawar, Orlando, 11th Intersociety Conference on Thermal and Thermomechanical Phenomena in Electronic Systems (ITherm 2008), FL, May 28-31, 2008.
- One of most cited articles for the years 2002-2005, International Journal of Heat and Mass Transfer, for the paper "Experimental and Numerical Study of Pressure Drop and Heat Transfer in a Single-phase Micro-channel heat Sink," by W. Qu and I. Mudawar, Vol. 45, pp. 2549-2565, 2002.
- Top 1% citation in research field, for the paper "Experimental and Numerical Study of Pressure Drop and Heat Transfer in a Single-Phase Micro-Channel Heat Sink," by W. Qu and I. Mudawar, International Journal of Heat and Mass Transfer, Vol. 46, pp. 2737-2753, 2003. Compiled by Essential Science Indicators, Thomson Publishing, 2005.
- Top 1% citation in research field, for the paper "Flow Boiling Heat Transfer in Two-Phase Micro-Channel Heat Sinks – I. Experimental Investigation and Assessment of Correlation Methods," by W. Qu and I. Mudawar, International Journal of Heat and Mass Transfer, Vol. 46, pp. 2755-2771, 2003. Compiled by Essential Science Indicators, Thomson Publishing, 2005.
- The Solberg Award for Best Teacher in the School of Mechanical Engineering, 2003-2004.
- Recognition plaque, Space and Missile Defense Conference and Expo, Huntsville, Alabama, August 2003
- Recognition plaque, SBIR Pavilion 5th Space and Missile Defense Conference, Huntsville, Alabama, August 2002.
- Citation of Appreciation for Contribution to ITherm 2002: International Conference on Thermal, Mechanics and Thermomechanical Phenomena in Electronic Systems, IEEE CPMT Society, 2002.
- Keynote Speaker, "Assessment of High-Heat-Flux Thermal Management Schemes," I-Therm 2000: International Conference on Thermal, Mechanics and Thermomechanical Phenomena in Electronic Systems, Joint IEEE, ASME, CPMT, IMAPS, NIST conference, Las Vegas, Nevada, May 2000.
- Invited Speaker, "High-Heat-Flux Liquid Cooling Schemes," Manufacturing Test Research Symposium 2000, Intel Corp., Hillsboro, Oregon, August 24, 2000.
- Who's Who in the World, 2000-present.
- The Ruth and Joel Spira Award for "outstanding contributions to the School of Mechanical Engineering and its students," 1999.
- Inaugural member of the Purdue University Book of Great Teachers for lasting tribute to those 200 teachers "who have defined Purdue teaching excellence since the institution's birth," 1999.
- Citation for Excellence in Teaching, School of Mechanical Engineering, 1997-1998
- Founding Fellow of The Purdue University Teaching Academy, 1997.
- Fellow of the American Society of Mechanical Engineers (ASME), 1997.
- The Purdue University Charles Murphy Award for Outstanding Teaching, 1996-1997.
- Citation for Excellence in Teaching, School of Mechanical Engineering, 1996-1997.
- Certificate of Appreciation, Heat Treating Society, ASM International, for the presentation "Investigation of Droplet Heat Transfer and Spray Quenching," 2nd International Conference on Quenching and the Control of Distortion, Cleveland, 1996.
- The Solberg Award for Best Teacher in the School of Mechanical Engineering, 1995-1996.
- Citation for Excellence in Teaching, School of Mechanical Engineering, 1995-1996.

- Keynote Speaker, "High-Flux Thermal Management of Avionics," 31st AIChE-ASME-ANS-AIAA National Heat Transfer Conference, Houston, Texas, August 1996.
- Who's Who in Science and Engineering, 1996-present.
- Outstanding Paper Award for 1995, The ASME Journal of Electronic Packaging, for the paper "Two-Phase Electronic Cooling using Mini-Channel and Micro-Channel Heat Sinks: Parts 1 and 2," Vol. 116, 1994.
- Nominee for State of Indiana Award for SBIR Innovation, 1995.
- Citation for Excellence in Teaching, School of Mechanical Engineering, 1994-1995.
- Certificate of Appreciation, International Society for Hybrid Microelectronics, 1994.
- Citation for Excellence in Teaching, School of Mechanical Engineering, 1992-1993.
- Best Paper in Thermal Management, 1992 ASME/JSME Joint Conference on Electronic Packaging, Milpitas, California, for the paper "Enhancement of Single-Phase Heat Transfer and Critical Heat Flux from an Ultra-High-Flux Simulated Microelectronic Heat Source to a Rectangular Impinging Jet of Dielectric Liquid".
- Keynote Speaker, "Direct-Immersion Cooling for High Power Electronic Chips," I-Therm II: Intersociety Conference on Thermal Phenomena in Electronic Systems, Austin, Texas, February 1992.
- Who's Who in the Mid West, 1992-present.
- Citation for Excellence in Teaching, School of Mechanical Engineering, 1991-1992.
- The Solberg Award for Best Teacher in the School of Mechanical Engineering, 1991-1992.
- Best Paper in Electronic Cooling, 1988 ASME/AIChE/ANS National Heat Transfer Conference, Houston, Texas, for the paper "Microelectronic Cooling by Enhanced Pool Boiling of a Dielectric Fluorocarbon Liquid".
- Certificate of appreciation in recognition of support to minority engineering students and programs at Purdue University awarded by the Purdue Chapter of the National Society of Black Engineers, 1987-1988.
- Professor of the Year Award, Purdue Chapter of the National Society of Black Engineers, 1986-1987.
- The Solberg Award for Best Teacher in the School of Mechanical Engineering, 1986-1987.
- Professor of the Year Award, Purdue Chapter of the National Society of Black Engineers, 1984-1985.

PATENTS:

- "Finned Heat Exchanger for Metal Hydride Hydrogen Storage," inventors: Issam Mudawar, Milan Visaria, Hui Zhang, and Timothee Pourpoint, US Patent No. 8,636,836, issued Jan. 28, 2014.
- "Coiled and Microchannel Heat Exchangers for Metal Hydride Storage Systems," inventors: Issam Mudawar, Milan Visaria, US Patent No. 8,778,063 B2, issued Jul. 15, 2014.

SCIENTIFIC AND HONOR SOCIETIES:

- Fellow, ASME
- Member, ASM International
- Senior Member, AIAA
- Member, American Society for Gravitational and Space Research (ASGSR)

PUBLICATIONS:

I. Handbooks

1. Hall, D.D. and Mudawar, I., 1999, "Critical Heat Flux (CHF) for Water Flow in Tubes. Volume I. Compilation and Assessment of the World CHF Data," Published by the Boiling and Two-Phase Flow Laboratory, Purdue University, West Lafayette, IN, 151 pages plus CD-ROM of the entire world database for CHF.

- Hall, D.D. and Mudawar, I., 1999, "Critical Heat Flux (CHF) for Water Flow in Tubes. Volume II. PU-BTPFL CHF Database," Published by the Boiling and Two-Phase Flow Laboratory, Purdue University, West Lafayette, IN, 1375 pages.
- Hall, D.D. and Mudawar, I., 1999, "Critical Heat Flux (CHF) for Water Flow in Tubes. Volume III. Subcooled CHF Correlations," Published by the Boiling and Two-Phase Flow Laboratory, Purdue University, West Lafayette, IN, 300 pages.
- Mudawar, I. and Qu, W., 2004, "Mini/Micro-Channel Thermal/Fluid Transport Phenomena," Published by Purdue University International Electronic Cooling Alliance, West Lafayette, IN, 434 pages.

II. Book Chapters

- Mudawar, I. and El-Masri, M.A., 1987, "Experimental Investigation of Boiling Water Films in Radial Rotating Channels," in *Heat Transfer and Fluid Flow in Rotating Machinery*, W.J. Yang, ed., Hemisphere Publishing Corporation, New York, pp. 255-269.
- Lee, C., and Mudawar, I., 1987, "A New Critical Heat Flux Model for Subcooled Two-Phase Flow Through a Vertical Tube," in *Particulate Phenomena and Multiphase Transport*, Vol. 1, T.N. Veziroglu, ed., Hemisphere Publishing Corporation, New York, pp. 425-442.
- Koskie, J., Mudawar, I., and Tiederman, W., 1987, "Characteristics of Interfacial Waves on Freely-Falling Liquid Films," in *Particulate Phenomena and Multiphase Transport*, Vol. 2, T.N. Veziroglu, ed., Hemisphere Publishing Corporation, New York, pp. 319-330.
- Mudawar, I., Incropera, T.A., and Incropera, F.P., 1987, "Critical Heat Flux (CHF) in Falling Liquid Films," in *Particulate Phenomena and Multiphase Transport*, Vol. 2, T.N. Veziroglu, ed., Hemisphere Publishing Corporation, New York, pp. 345-360.
- Shmerler, J. and Mudawar, I., 1987, "Effects of Interfacial Waves on Heat Transfer to Free-Falling Turbulent Liquid Films," in *Particulate Phenomena and Multiphase Transport*, Vol. 2, T.N. Veziroglu, ed., Hemisphere Publishing Corporation, New York, pp. 361-376.
- Mudawar, I., Incropera, T.A., and Incropera, F.P., 1988, "Microelectronic Cooling by Fluorocarbon Liquid Films," in *Cooling Technology for Electronic Equipment*, W. Aung, ed., Hemisphere Publishing Corporation, New York, pp. 417-434.
- Mudawar, I. and Bowers, M.B., 1996, "Parametric Study of Ultra-High CHF in Highly Subcooled Water Flow Inside Small Diameter Tubes," in *Convective Flow Boiling*, J.C. Chen, Y. Fujita, F. Mayinger, and R.A. Nelson, eds., Taylor and Francis, Washington, DC, pp. 117-122.
- Mudawar, I., Galloway, J.E., Gersey, C.O., and Reed, S.J., 1996, "Theoretical Modeling of CHF for Near-Saturated Pool Boiling and Flow Boiling from Short Heaters using the Interfacial Lift-off Criterion," in *Convective Flow Boiling*, J.C. Chen, Y. Fujita, F. Mayinger, and R.A. Nelson, eds., Taylor and Francis, Washington, DC, pp. 219-224.
- Mudawar, I. and Estes, K.A., 1996, "Modeling of Hydrodynamic Parameters and Critical Heat Flux in Spray Cooling," in *Convective Flow Boiling*, J.C. Chen, Y. Fujita, F. Mayinger, and R.A. Nelson, eds., Taylor and Francis, Washington, DC, pp. 345-350.

III. Journal Publications

- Mudawar, I., El-Masri, M.A., Wu, C.S., and Ausman-Mudawar, J.R., 1985, "Boiling Heat Transfer and Critical Heat Flux in High-Speed Rotating Liquid Films", *International Journal of Heat and Mass Transfer*, Vol. 28, pp. 795-806.
- Mudawar, I. and El-Masri, M.A., 1986, "Momentum and Heat Transfer Across Freely-Falling Turbulent Liquid Films," *International Journal of Multiphase Flow*, Vol. 12, pp. 771-790.
- Mudawar, I., 1986, "Interfacial Instabilities of Air-Driven Liquid Films", *International Communications in Heat and Mass Transfer*, Vol. 13, pp. 535-543.

4. Mudawwar, I., Incropera, T.A., and Incropera, F.P., 1987, "Boiling Heat Transfer and Critical Heat Flux in Liquid Films Falling on Vertically-Mounted Heat Sources," *International Journal of Heat and Mass Transfer*, Vol. 30, pp. 2083-2095.
5. Grimley, T.G., Mudawwar, I., and Incropera, F.P., 1988, "CHF Enhancement in Flowing Fluorocarbon Liquid Films Using Structured Surfaces and Flow Deflectors," *International Journal of Heat and Mass Transfer*, Vol. 31, pp. 55-65.
6. Shmerler, J.A. and Mudawwar, I., 1988, "Local Heat Transfer Coefficient in Wavy Free-Falling Turbulent Liquid Films Undergoing Uniform Sensible Heating," *International Journal of Heat and Mass Transfer*, Vol. 31, pp. 67-77.
7. Shmerler, J.A. and Mudawwar, I., 1988, "Local Evaporative Heat Transfer Coefficient in Turbulent Free-Falling Liquid Films," *International Journal of Heat and Mass Transfer*, Vol. 31, pp. 731-742.
8. Mudawwar, I. and El-Masri, M.A., 1988, "Boiling Incipience in Plane Rotating Water Films," *Journal of Heat Transfer*, Vol. 110, pp. 532-535.
9. Grimley, T.G., Mudawwar, I., and Incropera, F.P., 1988, "Limits to Critical Heat Flux Enhancement in a Liquid Film Falling over a Structured Surface which Simulates a Microelectronic Chip," *Journal of Heat Transfer*, Vol. 110, pp. 535-538.
10. Lee, C.H. and Mudawwar, I., 1989, "A Mechanistic Critical Heat Flux Model for Subcooled Flow Boiling Based on Local Bulk Flow Conditions," *International Journal of Multiphase Flow*, Vol. 14, pp. 711-728.
11. Marsh, W.J. and Mudawwar, I., 1989, "Predicting the Onset of Nucleate Boiling in Wavy Free-Falling Turbulent Liquid Films," *International Journal of Heat and Mass Transfer*, Vol. 32, pp. 361-378.
12. Maddox, D.E. and Mudawwar, I., 1989, "Critical Heat Flux in Subcooled Flow Boiling of Fluorocarbon Liquid on a Simulated Electronic Chip in a Rectangular Channel," *International Journal of Heat and Mass Transfer*, Vol. 32, pp. 379-394.
13. Marsh, W.J. and Mudawwar, I., 1989, "Effects of Surface Tension and Contact Angle on Sensible Heating and Boiling Incipience in Dielectric Falling Films," *Journal of Electronic Packaging*, Vol. 111, pp. 46-53.
14. Anderson, T.M. and Mudawwar, I., 1989, "Microelectronic Cooling by Enhanced Pool Boiling of a Dielectric Fluorocarbon Liquid," *Journal of Heat Transfer*, Vol. 111, pp. 752-759.
15. Maddox, D.E. and Mudawwar, I., 1989, "Single- and Two-Phase Convective Heat Transfer from Smooth and Enhanced Microelectronic Heat Sources in a Rectangular Channel," *Journal of Heat Transfer*, Vol. 111, pp. 1045-1052.
16. Koskie, J.E., Mudawwar, I., and Tiederman, W.G., 1989, "Parallel-Wire Probes for Measurement of Thick Liquid films," *International Journal of Multiphase Flow*, Vol. 15, pp. 521-530.
17. Lin, W.S., Pei, B.S., Lee, C.H., and Mudawwar, I., 1989, "A Theoretical Critical Heat Flux Model for Rod Bundles under PWR Conditions," *Nuclear Technology*, Vol. 85, pp. 213-226.
18. Deiters, T.A. and Mudawwar, I., 1989, "Optimization of Spray Quenching for Aluminum Extrusion, Forging or Continuous Casting," *Journal of Heat Treating*, Vol. 7, pp. 9-18.
19. Mudawwar, I. and Valentine, W.S., 1989, "Determination of the Local Quench Curve for Spray Cooled Metallic Surfaces," *Journal of Heat Treating*, Vol. 7, pp. 107-121.
20. Mudawwar, I. and Maddox, D.E., 1990, "Enhancement of Critical Heat Flux from High Power Microelectronic Heat Sources in a Flow Channel," *Journal of Electronic Packaging*, Vol. 112, pp. 241-248.
21. Mudawwar, I. and Anderson, T.M., 1990, "Parametric Investigation into the Effects of Pressure, Subcooling, Surface Augmentation and Choice of Coolant on Pool Boiling in the Design of Cooling Systems for High-Power Density Chips," *Journal of Electronic Packaging*, Vol. 112, pp. 375-382.
22. Wadsworth, D. and Mudawwar, I., 1990, "Cooling of a Multichip Electronic Module by Means of Confined Two-Dimensional Jets of Dielectric Liquid," *Journal of Heat Transfer*, Vol. 112, pp. 891-898.
23. Deiters, T.A. and Mudawwar, I., 1990, "Prediction of the Temperature-Time Cooling Curves for Three-Dimensional Aluminum Products During Spray-Quenching," *Journal of Heat Treating*, Vol. 8, pp. 81-91.

24. Lyu, T.H. and Mudawar, I., 1991, "Statistical Investigation of the Relationship Between Interfacial Waviness and Sensible Heat Transfer to a Falling Liquid Film," *International Journal of Heat and Mass Transfer*, Vol. 34, pp. 1451-1464.
25. Mudawar, I. and Wadsworth, D.C., 1991, "Critical Heat Flux from a Simulated Electronic Chip to a Confined Rectangular Impinging Jet of Dielectric Liquid," *International Journal of Heat and Mass Transfer*, Vol. 34, pp. 1465-1480.
26. Lyu, T.H. and Mudawar, I., 1991, "Determination of Wave-Induced Fluctuations of Wall Temperature and Convective Heat Transfer Coefficient in the Heating of a Turbulent Falling Liquid Film," *International Journal of Heat and Mass Transfer*, Vol. 34, pp. 2521-2534.
27. Lyu, T.H. and Mudawar, I., 1991, "Simultaneous Measurements of Thickness and Temperature Profile in a Wavy Liquid Film Falling Freely on a Heating Wall," *Experimental Heat Transfer*, Vol. 4, pp. 217-233.
28. Klinzing, W.P., Rozzi, J.C., and Mudawar, I., 1992, "Film and Transition Boiling Correlations for Quenching of Hot Surfaces with Water Sprays," *Journal of Heat Treating*, Vol. 9, pp. 91-103.
29. Rozzi, J.C., Klinzing, W.P., and Mudawar, I., 1992, "Effects of Spray Configuration on the Uniformity of Cooling Rate and Hardness in the Quenching of Aluminum Parts with Non-Uniform Shapes," *Journal of Materials Engineering and Performance*, Vol. 1, pp. 49-60.
30. Galloway, J.E. and Mudawar, I., 1992, "Critical Heat Flux Enhancement by Means of Liquid Subcooling and Centrifugal Force Induced by Flow Curvature," *International Journal of Heat and Mass Transfer*, Vol. 35, pp. 1247-1260.
31. Willingham, T.C. and Mudawar, I., 1992, "Channel Height Effects on Forced-Convection Boiling and Critical Heat Flux from a Linear Array of Discrete Heat Sources," *International Journal of Heat and Mass Transfer*, Vol. 35, pp. 1865-1880.
32. Wadsworth, D.C. and Mudawar, I., 1992, "Enhancement of Single-Phase Heat Transfer and Critical Heat Flux from an Ultra-High-Flux Simulated Microelectronic Heat Source to a Rectangular Impinging Jet of Dielectric Liquid," *Journal of Heat Transfer*, Vol. 114, pp. 764-768.
33. Gersey, C.O., Willingham, T.C., and Mudawar, I., 1992, "Design Parameters and Practical Considerations in the Two-Phase Forced-Convection Cooling of Multi-Chip Modules," *Journal of Electronic Packaging*, Vol. 114, pp. 280-289.
34. Gersey, C.O. and Mudawar, I., 1992, "Effects of Orientation on Critical Heat Flux from Chip Arrays during Flow Boiling," *Journal of Electronic Packaging*, Vol. 114, pp. 290-299.
35. Willingham, T.C. and Mudawar, I., 1992, "Forced-Convection Boiling and Critical Heat Flux from a Linear Array of Discrete Heat Sources," *International Journal of Heat and Mass Transfer*, Vol. 35, pp. 2879-2890.
36. Gersey, C.O. and Mudawar, I., 1993, "Nucleate Boiling and Critical Heat Flux from Protruded Chip Arrays during Flow Boiling," *Journal of Electronic Packaging*, Vol. 115, pp. 78-88.
37. Mudawar, I. and Anderson, T.M., 1993, "Optimization of Extended Surfaces for High Flux Chip Cooling by Pool Boiling," *Journal of Electronic Packaging*, Vol. 115, pp. 89-100.
38. Galloway, J.E. and Mudawar, I., 1993, "CHF Mechanism in Flow Boiling from a Short Heated Wall-Part 1. Examination of Near-Wall Conditions with the aid of Photomicrography and High-Speed Video Imaging," *International Journal of Heat and Mass Transfer*, Vol. 36, pp. 2511-2526.
39. Galloway, J.E. and Mudawar, I., 1993, "CHF Mechanism in Flow Boiling from a Short Heated Wall-Part 2. Theoretical CHF Model," *International Journal of Heat and Mass Transfer*, Vol. 36, pp. 2527-2540.
40. Gersey, C.O. and Mudawar, I., 1993, "Orientation Effects on Critical Heat Flux from Discrete, In-Line Heat Sources in a Flow Channel," *Journal of Heat Transfer*, Vol. 115, pp. 973-985.
41. Mudawar, I. and Hout, R.A., 1993, "Mass and Momentum Transport in Smooth Falling Liquid Films Laminarized at Relatively High Reynolds Numbers," *International Journal of Heat and Mass Transfer*, Vol. 36, pp. 3437-3448.
42. Mudawar, I. and Hout, R.A., 1993, "Measurement of Mass and Momentum Transport in Wavy-Laminar Falling Liquid Films," *International Journal of Heat and Mass Transfer*, Vol. 36, pp. 4151-4162.

43. Bowers, M.B. and Mudawar, I., 1994, "High Flux Boiling in Low Flow Rate, Low Pressure Drop Mini-Channel and Micro-Channel Heat Sinks," *International Journal of Heat and Mass Transfer*, Vol. 37, pp. 321-332.
44. Mudawar, I. and Deiters, T.A., 1994, "A Universal Approach to Predicting Temperature Response of Metallic Parts to Spray Quenching," *International Journal of Heat and Mass Transfer*, Vol. 37, pp. 347-362.
45. Mudawar, I., Jimenez, P.E., and Morgan, R.E., 1994, "Immersion-Cooled Standard Electronic Clamshell Module: A Building Block for Future High-Flux Avionics Systems," *Journal of Electronic Packaging*, Vol. 116, pp. 116-125..
47. Jimenez, P.E. and Mudawar, I., 1994, "A Multi-Kilowatt Immersion-Cooled Standard Electronic Clamshell Module for Future Aircraft Avionics," *Journal of Electronic Packaging*, Vol. 116, pp. 220-229.
46. Bowers, M.B. and Mudawar, I., 1994, "Two-Phase Electronic Cooling using Mini-Channel and Micro-Channel Heat Sinks - Part 1. Design Criteria and Heat Diffusion Constraints," *Journal of Electronic Packaging*, Vol. 116, pp. 290-297.
48. Bowers, M.B. and Mudawar, I., 1994, "Two-Phase Electronic Cooling using Mini-Channel and Micro-Channel Heat Sinks - Part 2. Flow Rate and Pressure Drop Constraints," *Journal of Electronic Packaging*, Vol. 116, pp. 298-305.
49. Gersey, C.O. and Mudawar, I., 1995, "Effects of Heater Length and Orientation on the Trigger Mechanism for Near-Saturated Flow Boiling CHF - I. Photographic and Statistical Characterization of the Near-Wall Interfacial Features," *International Journal of Heat and Mass Transfer*, Vol. 38, pp. 629-642.
50. Gersey, C.O. and Mudawar, I., 1995, "Effects of Heater Length and Orientation on the Trigger Mechanism for Near-Saturated Flow Boiling CHF - II. CHF Model," *International Journal of Heat and Mass Transfer*, Vol. 38, pp. 643-654.
51. Bernardin, J.D. and Mudawar, I., 1995, "Validation of the Quench Factor Technique in Predicting Hardness of Heat Treatable Aluminum Alloys," *International Journal of Heat and Mass Transfer*, Vol. 38, pp. 863-873.
52. Hall, D.D. and Mudawar, I., 1995, "Predicting the Impact of Quenching on Mechanical Properties of Complex-Shaped Aluminum Alloy Parts," *Journal of Heat Transfer*, Vol. 117, pp. 479-488.
53. Galloway, J.E. and Mudawar, I., 1995, "A Theoretical Model for Flow Boiling CHF from Concave Heaters," *Journal of Heat Transfer*, Vol. 117, pp. 698-707.
54. Hall, D.D. and Mudawar, I., 1995, "Experimental and Numerical Study of Quenching Complex-Shaped Metallic Alloys with Multiple, Overlapping Sprays," *International Journal of Heat and Mass Transfer*, Vol. 38, pp. 1201-1216.
55. Estes, K.A. and Mudawar, I., 1995, "Comparison of Two-Phase Electronic Cooling using Free Jets and Sprays," *Journal of Electronic Packaging*, Vol. 117, pp. 323-332.
56. Estes, K.A. and Mudawar, I., 1995, "Correlation of Sauter Mean Diameter and CHF for Spray Cooling of Small Surfaces," *International Journal of Heat and Mass Transfer*, Vol. 38, pp. 2985-2996.
57. Bernardin, J.D. and Mudawar, I., 1996, "An Experimental Investigation into the Relationship between Temperature-Time History and Surface Roughness in the Spray Quenching of Aluminum Parts," *Journal of Materials and Technology*, Vol. 118, pp. 127-134.
58. Hall, D.D. and Mudawar, I., 1996, "Optimization of Quench History of Aluminum Parts for Superior Mechanical Properties," *International Journal of Heat and Mass Transfer*, Vol. 39, pp. 81-95.
59. Johns, M.E. and Mudawar, I., 1996, "An Ultra-High Power Two-Phase Jet-Impingement Avionic Clamshell Module," *Journal of Electronic Packaging*, Vol. 118, pp. 264-270.
60. Mudawar, I. and Estes, K.A., 1996, "Optimizing and Predicting CHF in Spray Cooling of a Square Surface," *Journal of Heat Transfer*, Vol. 118, pp. 672-679.
61. Bernardin, J.D. and Mudawar, I., 1996, "Experimental and Statistical Investigation of Changes in Surface Roughness associated with Spray Quenching," *International Journal of Heat and Mass Transfer*, Vol. 39, pp. 2023-2037.

62. Bernardin, J.D., Stebbins, C.J. and Mudawar, I., 1997, "Effects of Surface Roughness on Water Droplet Impact History and Heat Transfer Regimes," *International Journal of Heat and Mass Transfer*, Vol. 40, pp. 73-88.
63. Bernardin, J.D., Stebbins, C.J. and Mudawar, I., 1997, "Mapping of Impact and Heat Transfer Regimes of Water Drops Impinging on a Polished Surface," *International Journal of Heat and Mass Transfer*, Vol. 40, pp. 247-267.
64. Hall, D.D. and Mudawar, I., 1997, "Evaluation of Subcooled CHF Correlations Using the PU-BTPFL Database for Vertical Upflow of Water in a Uniformly Heated Round Tube," *Nuclear Technology*, Vol. 117, pp. 234-247.
65. Bernardin, J.D., Mudawar, I., Walsh, C.B. and Franses, E.I., 1997, "Contact Angle Temperature Dependence for Water Droplets on Practical Aluminum Surfaces," *International Journal of Heat and Mass Transfer*, Vol. 40, pp. 1017-1034.
66. Hall, D.D., Mudawar, I., Morgan, R.E. and Ehlers, S.L., 1997, "Validation of a Systematic Approach to Modeling Spray Quenching of Aluminum Alloy Extrusions, Composites, and Continuous Castings," *Journal of Materials Engineering and Performance*, Vol. 6, pp. 77-92.
67. Mudawar, I., Howard, A.H. and Gersey, C.O., 1997, "An Analytical Model for Near-Saturated Pool Boiling CHF on Vertical Surfaces," *International Journal of Heat and Mass Transfer*, Vol. 40, pp. 2327-2339.
68. Reed, S.J. and Mudawar, I., 1997, "Enhancement of Boiling Heat Transfer using Highly Wetting Liquids with Pressed-on Fins at Low Contact Forces," *International Journal of Heat and Mass Transfer*, Vol. 40, pp. 2379-2392.
69. Bernardin, J.D. and Mudawar, I., 1997, "Film Boiling Heat transfer of Droplet Streams and Sprays," *International Journal of Heat and Mass Transfer*, Vol. 40, pp. 2579-2593.
70. Sturgis, J.C. and Mudawar, I., 1999, "Single-Phase Heat Transfer Enhancement in a Curved, Rectangular Channel Subjected to Concave Heating," *International Journal of Heat and Mass Transfer*, Vol. 42, pp. 1255-1272.
71. Mudawar, I. and Bowers, M.B., 1999, "Ultra-High Critical Heat Flux (CHF) for Subcooled Water Flow Boiling - I. CHF Data and Parametric Effects for Small Diameter Tubes," *International Journal of Heat and Mass Transfer*, Vol. 42, pp. 1405-1428.
72. Hall, D.D. and Mudawar, I., 1999, "Ultra-High Critical Heat Flux (CHF) for Subcooled Water Flow Boiling - II. High-CHF Database and Design Parameters," *International Journal of Heat and Mass Transfer*, Vol. 42, pp. 1429-1456.
73. Howard, A.H. and Mudawar, I., 1999, "Orientation Effects on Pool Boiling CHF and Modeling of CHF for Near-Vertical Surfaces," *International Journal of Heat and Mass Transfer*, Vol. 42, pp. 1665-1688.
74. Sturgis, J.C. and Mudawar, I., 1999, "Critical Heat Flux in a Long, Rectangular Channel Subjected to One-Sided Heating - I. Flow Visualization," *International Journal of Heat and Mass Transfer*, Vol. 42, pp. 1835-1847.
75. Sturgis, J.C. and Mudawar, I., 1999, "Critical Heat Flux in a Long, Rectangular Channel Subjected to One-Sided Heating - II. Analysis of CHF Data," *International Journal of Heat and Mass Transfer*, Vol. 42, pp. 1849-1862.
76. Reed, S.J. and Mudawar, I., 1999, "Elimination of Boiling Incipience Temperature Drop in Highly Wetting Fluids using Spherical Contact with a Flat Surface," *International Journal of Heat and Mass Transfer*, Vol. 42, pp. 2439-2454.
77. Sturgis, J.C. and Mudawar, I., 1999, "Critical Heat Flux in a Long, Curved Channel Subjected to Concave Heating," *International Journal of Heat and Mass Transfer*, Vol. 42, pp. 3831-3848.
78. Sturgis, J.C. and Mudawar, I., 1999, "Assessment of CHF Enhancement Mechanisms in a Curved, Rectangular Channel Subjected to Concave Heating," *Journal of Heat Transfer*, Vol. 121, pp. 394-404.
79. Hall, D.D. and Mudawar, I., 2000, "Critical Heat Flux (CHF) for Water Flow in Tubes - I. Compilation and Assessment of World CHF Data," *International Journal of Heat and Mass Transfer*, Vol. 43, pp. 2573-2604.
80. Hall, D.D. and Mudawar, I., 2000, "Critical Heat Flux (CHF) for Water Flow in Tubes - II. Subcooled CHF Correlations," *International Journal of Heat and Mass Transfer*, Vol. 43, pp. 2605-2640.

81. Bernardin, J.D. and Mudawar, I., 1999, "The Leidenfrost Point - Experimental Study and Assessment of Existing Models," *Journal of Heat Transfer*, Vol. 121, pp. 894-903.
82. LaClair, T.J. and Mudawar, I., 2000, "Thermal Transients in a Capillary Evaporator Prior to the Initiation of Boiling," *International Journal of Heat and Mass Transfer*, Vol. 43, pp. 3937-3952.
83. Mudawar, I., 2001, "Assessment of High-Heat-Flux Thermal Management Schemes," *IEEE Transactions-CPMT: Components and Packaging Technologies*, Vol. 24, pp. 122-141.
84. Qu, W. and Mudawar, I., 2002, "Experimental and Numerical Study of Pressure Drop and Heat Transfer in a Single-Phase Micro-channel Heat Sink," *International Journal of Heat and Mass Transfer*, Vol. 45, pp. 2549-2565.
85. Qu, W. and Mudawar, I., 2002, "Analysis of Three-Dimensional Heat Transfer in Micro-Channel Heat Sinks," *International Journal of Heat and Mass Transfer*, Vol. 45, pp. 3973-3985.
86. Qu, W. and Mudawar, I., 2002, "Prediction and Measurement of Incipient Boiling Heat Flux in Micro-Channel Heat Sinks," *International Journal of Heat and Mass Transfer*, Vol. 45, pp. 3933-3945.
87. Bernardin, J.D. and Mudawar, I., 2002, "A Cavity Activation and Bubble Growth Model of the Leidenfrost Point," *Journal of Heat Transfer*, Vol. 124, pp. 864-874.
88. Zhang, H., Mudawar, I., and Hasan, M.M., 2002, "Experimental Assessment of the Effects of Body Force, Surface Tension Force, and Inertia on Flow Boiling CHF," *International Journal of Heat and Mass Transfer*, Vol. 45, pp. 4079-4095.
89. Zhang, H., Mudawar, I., and Hasan, M.M., 2002, "Experimental and Theoretical Study of Orientation Effects on Flow Boiling CHF," *International Journal of Heat and Mass Transfer*, Vol. 45, pp. 4463-4478.
90. Wen, C.-D. and Mudawar, I., 2002, "Experimental Investigation of Emissivity of Aluminum Alloys, and Temperature Determination using Multispectral Radiation Thermometry (MRT) Algorithms," *Journal of Materials Engineering and Performance*, Vol. 11, pp. 551-562.
91. Qu, W. and Mudawar, I., 2003, "Measurement and Prediction of Pressure Drop in Two-Phase Micro-Channel Heat Sinks," *International Journal of Heat and Mass Transfer*, Vol. 46, pp. 2737-2753.
92. Qu, W. and Mudawar, I., 2003, "Flow Boiling Heat Transfer in Two-Phase Micro-Channel Heat Sinks – I. Experimental Investigation and Assessment of Correlation Methods," *International Journal of Heat and Mass Transfer*, Vol. 46, pp. 2755-2771.
93. Qu, W. and Mudawar, I., 2003, "Flow Boiling Heat Transfer in Two-Phase Micro-Channel Heat Sinks – II. Annular Two-Phase Flow Model," *International Journal of Heat and Mass Transfer*, Vol. 46, pp. 2773-2784.
94. Mukherjee, S. and Mudawar, I., 2003, "Smart Pumpless Loop for Micro-Channel Electronic Cooling using Flat and Enhanced Surfaces," *IEEE Transactions-CPMT: Components and Packaging Technologies*, Vol. 26, pp. 99-109.
95. Qu, W. and Mudawar, I., 2003, "Thermal Design Methodology for High-Heat-Flux Single-Phase and Two-Phase Micro-Channel Heat Sinks," *IEEE Transactions-CPMT: Components and Packaging Technologies*, Vol. 26, pp. 598-609.
96. Mukherjee, S. and Mudawar, I., 2003, "Pumpless Loop for Narrow Channel and Micro-Channel Boiling from Vertical Surfaces," *Journal of Electronic Packaging*, Vol. 125, pp. 431-441.
97. Zhang, H., Mudawar, I., and Hasan, M.M., 2004, "Investigation of Interfacial Behavior During the Flow Boiling CHF Transient," *International Journal of Heat and Mass Transfer*, Vol. 47, pp. 1275-1288.
98. Qu, W. and Mudawar, I., 2004, "Measurement and Correlation of Critical Heat Flux in Two-Phase Micro-Channel Heat Sinks," *International Journal of Heat and Mass Transfer*, Vol. 47, pp. 2045-2059.
99. Zhang, H., Mudawar, I., and Hasan, M.M., 2004, "A Method for Assessing the Importance of Body Force on Flow Boiling CHF," *Journal of Heat Transfer*, Vol. 126, pp. 161-168.
100. Bernardin, J.D. and Mudawar, I., 2004, "A Leidenfrost Point Model for Impinging Droplets and Sprays," *Journal of Heat Transfer*, Vol. 126, pp. 272-278.

101. Qu, W. and Mudawar, I., 2004, "Transport Phenomena in Two-Phase Micro-Channel Heat Sinks," *Journal of Electronic Packaging*, Vol. 126, pp. 213-224.
102. Wen, C.-D. and Mudawar, I., 2004, "Emissivity Characteristics of Roughened Aluminum Alloy Surfaces and Assessment of Multispectral Radiation Thermometry (MRT) Emissivity Models," *International Journal of Heat and Mass Transfer*, Vol. 47, pp. 3591-3605.
103. Qu, W., Yoon, S.-M., and Mudawar, I., 2004, "Two-Phase Flow and Heat Transfer in Rectangular Micro-Channels," *Journal of Electronic Packaging*, Vol. 126, pp. 288-300.
104. Lee, J. and Mudawar, I., 2005, "Two-Phase Flow in High-Heat-Flux Micro-Channel Heat Sink for Refrigeration Cooling Applications: Part I – Pressure drop Characteristics," *International Journal of Heat and Mass Transfer*, Vol. 48, pp. 928-940.
105. Lee, J. and Mudawar, I., 2005, "Two-Phase Flow in High-Heat-Flux Micro-Channel Heat Sink for Refrigeration Cooling Applications: Part II – Heat Transfer Characteristics," *International Journal of Heat and Mass Transfer*, Vol. 48, pp. 941-955.
106. Wen, C.-D. and Mudawar, I., 2005, "Emissivity Characteristics of Polished Aluminum Alloys and Assessment of Multispectral Radiation Thermometry (MRT) Emissivity Models," *International Journal of Heat and Mass Transfer*, Vol. 48, pp. 1316-1329.
107. Qu, W. and Mudawar, I., 2005, "A Systematic Method for Optimal Design of Two-Phase Micro-Channel Heat sinks," *Journal of Electronic Packaging*, Vol. 127, pp. 381-390.
108. Zhang, H., Mudawar, I., and Hasan, M.M., 2005, "Flow Boiling CHF in Microgravity," *International Journal of Heat and Mass Transfer*, Vol. 48, pp. 3107-3118.
109. Qu, W., Mudawar, I., Lee, S.-Y. and Wereley, S. T., 2006, "Experimental and Computational Investigation of Flow Development and Pressure Drop in a Rectangular Micro-Channel," *Journal of Electronic Packaging*, Vol. 128, pp. 1-9.
110. Zhang, I., Fisher, T.S., Ramachandran, P.V., Gore, J. and Mudawar, I., 2005, "A Review of Thermal Issues in Hydrogen Storage Technologies," *Journal of Heat Transfer*, Vol. 127, pp. 1391-1399.
111. Lee, J. and Mudawar, I., 2006, "Implementation of Micro-Channel Evaporator for High-Heat-Flux Refrigeration Cooling Applications," *Journal of Electronic Packaging*, Vol. 128, pp. 30-37.
112. Rybicki, J.R. and Mudawar, I., 2006, "Single-Phase and Two-Phase Cooling Characteristics of Upward-Facing and Downward-Facing Sprays," *International Journal of Heat and Mass Transfer*, Vol. 49, pp. 5-16.
113. Sung, M.K. and Mudawar, I., 2006, "Experimental and Numerical Investigation of Single-Phase Heat Transfer using a Hybrid Jet Impingement/Micro-Channel Cooling Scheme," *International Journal of Heat and Mass Transfer*, Vol. 49, pp. 682-694.
114. Wen, C.-D. and Mudawar, I., 2006, "Modeling the Effects of Surface Roughness on the Emissivity of Aluminum Alloys," *International Journal of Heat and Mass Transfer*, Vol. 49, pp. 4279-4289.
115. Meyer, M.T, Mudawar, I., Boyack, C.E. and Hale, C.A., 2006, "Single and Two-Phase Cooling with an Array of Rectangular Jets," *International Journal of Heat and Mass Transfer*, Vol. 49, pp. 17-29.
116. Sung, M.K. and Mudawar, I., 2006, "Correlation of Critical Heat Flux in Hybrid Jet Impingement/Micro-Channel Cooling Scheme," *International Journal of Heat and Mass Transfer*, Vol. 49, pp. 2663-2672.
117. Wen, C.-D. and Mudawar, I., 2006, "Mathematical Determination of Emissivity and Surface Temperature of Aluminum Alloys using Multispectral Radiation Thermometry," *International Communications in Heat and Mass Transfer*, Vol. 33, pp. 1063-1070.
118. Lee, J. and Mudawar, I., 2007, "Assessment of the Effectiveness of Nanofluids for Single-Phase and Two-Phase Heat Transfer in Micro-Channels," *International Journal of Heat and Mass Transfer*, Vol. 50, pp. 452-463.
119. Bernardin, J.D. and Mudawar, I., 2007, "Transition Boiling Heat Transfer of Droplet Streams and Sprays," *Journal of Heat Transfer*, Vol. 129, pp. 1605-1610.
120. Zhang, H., Mudawar, I., and Hasan, M.M., 2007, "CHF Model for Subcooled Flow Boiling in Earth Gravity and Microgravity," *International Journal of Heat and Mass Transfer*, Vol. 50, pp. 4039-4051.

121. Ujereh, S., Fisher, T. and Mudawar, I., 2007, "Effects of Carbon Nanotube Arrays on Nucleate Pool Boiling," *International Journal of Heat and Mass Transfer*, Vol. 50, pp. 4023-4038.
122. Visaria, M. and Mudawar, I., 2008, "Theoretical and Experimental Study of the Effects of Spray Inclination on Two-Phase Spray Cooling and Critical Heat Flux," *International Journal of Heat and Mass Transfer*, Vol. 51, pp. 2398-2410
123. Visaria, M. and Mudawar, I., 2007, "A Systematic Approach to Predicting Critical Heat Flux for Inclined Sprays," *Journal of Electronic Packaging*, Vol. 129, pp. 452-459.
124. Zhang, H., Mudawar, I., and Hasan, M.M., 2007, "Assessment of Dimensionless CHF Correlations for Subcooled Flow Boiling in Microgravity and Reduced Gravity," *International Journal of Heat and Mass Transfer*, Vol. 50, pp. 4568-4580.
125. Zhang, H., Mudawar, I., and Hasan, M.M., 2007, "Photographic Study of High-Flux Subcooled Flow Boiling and Critical Heat Flux," *International Communications in Heat and Mass Transfer*, Vol. 34, pp. 653-660.
126. Zhang, J., Zheng, Y., Gore, J.P., Mudawar, I., and Fisher, T.S., 2007, "1kWe Sodium Borohydride Hydrogen Generation System – Par II: Reactor Modeling," *Journal of Power Sources*, Vol. 170, pp. 150-159.
127. Lee, J. and Mudawar, I., 2008, "Fluid Flow and Heat Transfer Characteristics of Low temperature Two-Phase Micro-Channel Heat Sinks – Part 1: Experimental Methods and Flow Visualization Results," *International Journal of Heat and Mass Transfer*, Vol. 51, pp. 4315-4326.
128. Lee, J. and Mudawar, I., 2008, "Fluid Flow and Heat Transfer Characteristics of Low temperature Two-Phase Micro-Channel Heat Sinks – Part 2: Subcooled Boiling Pressure Drop and Heat Transfer," *International Journal of Heat and Mass Transfer*, Vol. 51, pp. 4327-4341.
129. Sung, M.K. and Mudawar, I., 2008, "Single-Phase Hybrid Micro-Channel/Jet Impingement Cooling," *International Journal of Heat and Mass Transfer*, Vol. 51, pp. 4342-4352.
130. Sung, M.K. and Mudawar, I., 2008, "Single-Phase and Two-Phase heat Transfer Characteristics of Low Temperature Hybrid Micro-Channel/Micro-Jet Impingement Cooling Module," *International Journal of Heat and Mass Transfer*, Vol. 51, pp. 3882-3895.
131. Visaria, M. and Mudawar, I., 2008, "Effects of High Subcooling on Two-Phase Spray Cooling and Critical Heat Flux," *International Journal of Heat and Mass Transfer*, Vol. 51, pp. 5269-5278.
132. Sung, M.K. and Mudawar, I., 2008, "Single-Phase and Two-Phase Cooling using Hybrid Micro-Channel/Slot-Jet Module," *International Journal of Heat and Mass Transfer*, Vol. 51, pp. 3825-3839.
133. Sung, M.K. and Mudawar, I., 2008, "Effects of Jet Pattern on Single-Phase Cooling Performance of Hybrid Micro-Channel/Micro-Circular-Jet-Impingement Thermal Management Scheme," *International Journal of Heat and Mass Transfer*, Vol. 51, pp. 4614-4627.
134. Howard, A.H. and Mudawar, I., 2008, "Photographic Study of Pool Boiling CHF from a Downward-Facing Convex Surface," *International Communications in Heat and Mass Transfer*, Vol. 35, pp. 793-799.
135. LaClair, T.J. and Mudawar, I., 2009, "Theoretical Model for Fast Bubble Growth in Small Channels with Reference to Startup of Capillary Pumped Loops used in Spacecraft Thermal Management Systems," *International Journal of Heat and Mass Transfer*, Vol. 52, pp. 716-723.
136. Lee, J. and Mudawar, I., 2009, "Critical Heat Flux for Subcooled Flow Boiling in Micro-Channel Heat Sinks," *International Journal of Heat and Mass Transfer*, Vol. 52, pp. 3341-3352.
137. Sung, M.K. and Mudawar, I., 2009, "Effects of Jet Pattern on Two-Phase Cooling Performance of Hybrid Micro-Channel/Micro-Circular-Jet-Impingement Thermal Management Scheme," *International Journal of Heat and Mass Transfer*, Vol. 52, pp. 3364-3372.
138. Sung, M.K. and Mudawar, I., 2009, "CHF Determination for High-Heat-Flux Phase-Change Cooling System Incorporating both Micro-Channel Flow and Jet-Impingement," *International Journal of Heat and Mass Transfer*, Vol. 52, pp. 610-619.
139. Sung, M.K. and Mudawar, I., 2009, "Single-Phase and Two-Phase Hybrid Cooling Scheme for high-Heat-Flux Thermal Management of Defense Electronics," *Journal of Electronic Packaging*, Vol. 131, 021013.

140. Lee, J. and Mudawar, I., 2009, "Experimental Investigation and Theoretical Model for Subcooled Flow Boiling Pressure Drop in Micro-Channel Heat Sinks," *Journal of Electronic Packaging*, Vol. 131, 031008.
141. Lee, J. and Mudawar, I., 2009, "Low-Temperature Two-Phase Micro-Channel Cooling for High-Heat-Flux Thermal management of Defense Electronics," *IEEE Transactions-CPMT: Components and Packaging Technologies*, Vol. 32, pp. 453-465.
142. Zhang, H., Mudawar, I. and Hasan, M.M., 2009, "Application of Flow Boiling for Thermal Management of Electronics in Microgravity and Reduced Gravity Systems," *IEEE Transactions-CPMT: Components and Packaging Technologies*, Vol. 32, pp. 466-477.
143. Mudawar, I., Bharathan, D., Kelly, K. and Narumanchi, S., 2009, "Two-Phase Spray Cooling of Hybrid Vehicle Electronics," *IEEE Transactions-CPMT: Components and Packaging Technologies*, Vol. 32, pp. 501-512.
144. Khanikar, V., Mudawar, I., Fisher, T., 2009, "Effects of Carbon Nanotube Coating on Flow Boiling in a Micro-Channel," *International Journal of Heat and Mass Transfer*, Vol. 52, pp. 3805-3817.
145. Khanikar, V., Mudawar, I., Fisher, T., 2009, "Flow Boiling in Micro-Channel Coated with Carbon Nanotubes," *IEEE Transactions-CPMT: Components and Packaging Technologies*, Vol. 32, pp. 639-649.
146. Visaria, M. and Mudawar, I., 2009, "Application of Two-Phase Spray Cooling for Thermal Management of Electronic Devices," *IEEE Transactions-CPMT: Components and Packaging Technologies*, Vol. 32, pp. 784-793.
147. Pourpoint, T.L., Velagapudi, V., Mudawar, I., Zheng, Y. and Fisher, S.T., 2010, "Active Cooling of a Metal Hydride System for Hydrogen Storage," *International Journal of Heat and Mass Transfer*, Vol. 53, pp. 1326-1332.
148. Smith, K.C., Zheng, Y., Fisher, T.S., Mudawar, I., and Pourpoint, T.L., 2009, "Heat Transfer in High-Pressure Metal Hydride Systems," *Journal of Enhanced Heat Transfer*, Vol. 16, pp. 189-203.
149. Visaria, M., Mudawar, I., Pourpoint, T., Kumar, S., 2010, "Study of Heat Transfer and Kinetics Parameters Influencing the Design of Heat Exchangers for Hydrogen Storage in High-Pressure Metal Hydrides," *International Journal of Heat and Mass Transfer*, Vol. 53, pp. 2229-2239.
150. Kim, S.M. and Mudawar, I., 2010, "Analytical Heat Diffusion Models for Different Micro-Channel Heat Sink Cross-Sectional Geometries," *International Journal of Heat and Mass Transfer*, Vol. 53, pp. 4001-4016.
151. Kim, S.M. and Mudawar, I., 2010, "Analytical Heat Diffusion Models for Heat Sinks with Circular Micro-Channels," *International Journal of Heat and Mass Transfer*, Vol. 53, pp. 4552-4566.
152. Mascarenhas, N. and Mudawar, I., 2010, "Analytical and Computational Methodology for Modeling Spray Quenching of Solid Metal Alloy Cylinders," *International Journal of Heat and Mass Transfer*, Vol. 53, pp. 5871-5883.
153. Visaria, M., Mudawar, I. and Pourpoint, T., 2011, "Enhanced Heat Exchanger Design for Hydrogen Storage using High-Pressure Metal Hydride – Part 1. Design Methodology and Computational Results," *International Journal of Heat and Mass Transfer*, Vol. 54, pp. 413-423.
154. Visaria, M., Mudawar, I. and Pourpoint, T., 2011, "Enhanced Heat Exchanger Design for Hydrogen Storage using High-Pressure Metal Hydride – Part 2. Experimental Methods," *International Journal of Heat and Mass Transfer*, Vol. 54, pp. 424-432.
155. Nacke, R., Northcutt B. and Mudawar, I., 2011, "Theory and Experimental Validation of Cross-Flow Micro-Channel Heat Exchanger Module with reference to High Mach Aircraft Turbine Engines," *International Journal of Heat and Mass Transfer*, Vol. 54, pp. 1224-1235.
156. Mudawar, I., 2011, "Two-Phase Micro-Channel Heat Sinks: Theory, Applications and Limitations," *Journal of Electronic Packaging*, Vol. 133, 041002-2.
157. Kharangate, C.R. and Mudawar, I. and Hasan, M.H., 2012, "Experimental and Theoretical Study of Critical Heat Flux in Vertical Upflow with Inlet Vapor Void," *International Journal of Heat and Mass Transfer*, Vol. 55, pp. 360-374.
158. Kim, S.M. and Mudawar, I., 2012, "Theoretical Model for Annular Flow Condensation in Rectangular Micro-Channels," *International Journal of Heat and Mass Transfer*, Vol. 55, pp. 958-970.

159. Kim, S.M., Kim, J. and Mudawar, I., 2012, "Flow Condensation in Parallel Micro-Channels – Part 1: Experimental Results and Assessment of Pressure Drop Correlations," *International Journal of Heat and Mass Transfer*, Vol. 55, pp. 971-983.
160. Kim, S.M. and Mudawar, I., 2012, "Flow Condensation in Parallel Micro-Channels – Part 2: Heat transfer Results and Correlation Technique," *International Journal of Heat and Mass Transfer*, Vol. 55, pp. 984-994.
161. Visaria, M. and Mudawar, I., 2012, "Coiled-Tube Heat Exchanger for High-Pressure Metal Hydride Hydrogen Storage Systems– Part 1. Experimental Study," *International Journal of Heat and Mass Transfer*, Vol. 55, pp. 1782-1795.
162. Visaria, M. and Mudawar, I., 2012, "Coiled-Tube Heat Exchanger for High-Pressure Metal Hydride Hydrogen Storage Systems– Part 2. Computational Model," *International Journal of Heat and Mass Transfer*, Vol. 55, pp. 1796-1806.
163. Visaria, M. and Mudawar, I., 2012, "Experimental Investigation and Theoretical Modeling of Dehydriding Process in High-Pressure Metal Hydride Hydrogen Storage Systems," *International Journal of Hydrogen Energy*, Vol. 37, pp. 5735-5749.
164. Mascarenhas, N. and Mudawar, I., 2012, "Methodology for Predicting Spray Quenching of Thick-Walled Metal Alloy Tubes," *International Journal of Heat and Mass Transfer*, Vol. 55, pp. 2953-2964.
165. Kim, S.M. and Mudawar, I., 2012, "Universal Approach to Predicting Two-Phase Frictional Pressure Drop for Adiabatic and Condensing Mini/Micro-Channel Flows," *International Journal of Heat and Mass Transfer*, Vol. 55, pp. 3246-3261.
166. Kim, S.M. and Mudawar, I., 2012, "Consolidated Method to Predicting Pressure Drop and Heat Transfer Coefficient for both Subcooled and Saturated Flow Boiling in Micro-Channel Heat Sinks," *International Journal of Heat and Mass Transfer*, Vol. 55, pp. 3720-3731.
167. Kharangate, C.R. and Mudawar, I. and Hasan, M.H., 2012, "Photographic Study and Modeling of Critical Heat Flux in Horizontal Flow Boiling with Inlet Vapor Void," *International Journal of Heat and Mass Transfer*, Vol. 55, pp. 4154-4168.
168. Northcutt, B. and Mudawar, I., 2012, "Enhanced Design of Cross-Flow Micro-Channel Heat Exchanger for High-Performance Aircraft Gas Turbine Engines," *Journal of Heat Transfer*, Vol. 134, 061801-1.
169. Kim, S.M. and Mudawar, I., 2013, "Universal Approach to Predicting Heat Transfer Coefficient for Condensing Mini/Micro-Channel Flows," *International Journal of Heat and Mass Transfer*, Vol. 56, pp. 238-250.
170. Park, I., Kim, S.M. and Mudawar, I., 2013, "Experimental Measurement and Modeling of Downflow Condensation in a Circular Tube," *International Journal of Heat and Mass Transfer*, Vol. 57, pp. 567-581.
171. Kim, S.M. and Mudawar, I., 2013, "Universal Approach to Predicting Two-Phase Frictional Pressure Drop for Mini/Micro-Channel Saturated Flow Boiling," *International Journal of Heat and Mass Transfer*, Vol. 58, pp. 718-734.
172. Mudawar, I., 2013, "Recent Advances in High-Flux, Two-Phase Thermal Management," *Journal of Thermal Science and Engineering Applications*, Vol. 5, 021012.
173. Konishi, C., Mudawar, I. and Hasan, M.M., 2013, "Investigation of the Influence of Orientation on Critical Heat Flux for Flow Boiling with Two-Phase Inlet," *International Journal of Heat and Mass Transfer*, Vol. 61, pp. 176-190.
174. Lee, H., Mudawar, I. and Hasan, M.M., 2013, "Experimental and Theoretical Investigation of Annular Flow Condensation in Microgravity," *International Journal of Heat and Mass Transfer*, Vol. 61, pp. 293-309.
175. Mascarenhas, N. and Mudawar, I. 2013, "Investigation of Eddy Diffusivity and Heat Transfer Coefficient for Free-Falling Turbulent Liquid Films Subjected to Sensible Heating," *International Journal of Heat and Mass Transfer*, Vol. 64, pp. 647-660.
176. Kim, S.M. and Mudawar, I., 2013, "Universal Approach to Predicting Saturated Flow Boiling Heat Transfer in Mini/Micro-Channels Part I. Dryout Incipience Quality," *International Journal of Heat and Mass Transfer*, Vol. 64, pp. 1226-1238.

177. Kim, S.M. and Mudawar, I., 2013, "Universal Approach to Predicting Saturated Flow Boiling Heat Transfer in Mini/Micro-Channels Part II. Two-Phase Heat Transfer Coefficient," *International Journal of Heat and Mass Transfer*, Vol. 64, pp. 1239-1256.
178. Park, I. and Mudawar, I., 2013, "Climbing Film, Flooding and Falling Film Behavior in Upflow Condensation in Tubes," *International Journal of Heat and Mass Transfer*, Vol. 65, pp. 44-61.
179. Konishi, C., Mudawar, I. and Hasan, M.M., 2013, "Criteria for Negating the Influence of Gravity on Flow Boiling Critical Heat Flux with Two-Phase Inlet Conditions," *International Journal of Heat and Mass Transfer*, Vol. 65, pp. 203-218.
180. Lee, H. and Mudawar, I., and Hasan, M.M., 2013, "Flow Condensation in Horizontal Tubes," *International Journal of Heat and Mass Transfer*, Vol. 66, pp. 31-45.
181. Konishi, C., Mudawar, I. and Hasan, M.M., 2013, "Investigation of Localized Dryout versus CHF in Saturated Flow Boiling," *International Journal of Heat and Mass Transfer*, Vol. 67, pp. 131-146.
182. Mascarenhas, N. and Mudawar, I., 2013, "Study of the Influence of Interfacial Waves on Heat Transfer in Turbulent Falling Films," *International Journal of Heat and Mass Transfer*, Vol. 67, pp. 1106-1121.
183. Lee, H., Park, I., Konishi, C., Mudawar, I., May, R.I., Juergens, J.R., Wagner, J.D., Hall, N.R., Nahra, H.K., Hasan, M. and Jeffrey R. Mackey, J.R., 2014, "Experimental Investigation of Flow Condensation in Microgravity," *Journal of Heat Transfer*, Vol. 136, 021701.
184. Mascarenhas, N. and Mudawar, I., 2014, "Statistical Analysis of Measured and Computed Thickness and Interfacial Temperature of Free-Falling Turbulent Liquid Films," *International Journal of Heat and Mass Transfer*, Vol. 73, pp. 716-730.
185. Kim, S.M. and Mudawar, I., 2014, "Theoretical Model for Local Heat Transfer Coefficient for Annular Flow Boiling in Circular Mini/Micro-Channels," *International Journal of Heat and Mass Transfer*, Vol. 73, pp. 731-742.
186. Kim, S.M. and Mudawar, I., 2014, "Review of Databases and Predictive Methods for Pressure Drop in Adiabatic, Condensing and Boiling Mini/Micro-Channel Flows," *International Journal of Heat and Mass Transfer*, Vol. 77, pp. 74-97.
187. Kim, S.M. and Mudawar, I., 2014, "Review of Databases and Predictive Methods for Heat Transfer in Condensing and Boiling Mini/Micro-Channel Flows," *International Journal of Heat and Mass Transfer*, Vol. 77, pp. 627-652.
188. Lee, H., Park I., Mudawar, I. and Hasan M.M., 2014, "Micro-Channel Evaporator for Space Applications – 1. Experimental Pressure Drop and Heat Transfer Results for Different Orientations in Earth Gravity," *International Journal of Heat and Mass Transfer*, Vol. 77, pp. 1213-1230.
189. Lee H., Park I., Mudawar, I. and Hasan M.M., 2014, "Micro-Channel Evaporator for Space Applications – 2. Assessment of Predictive Tools," *International Journal of Heat and Mass Transfer*, Vol. 77, pp. 1231-1249.
190. Konishi, C., Mudawar, I., 2015, "Review of Flow Boiling and Critical Heat Flux in Microgravity," *International Journal of Heat and Mass Transfer*, Vol. 80, pp. 469-493.
191. Park I., Lee H. and Mudawar, I., 2015, "Determination of Flow Regimes and Heat Transfer Coefficient for Condensation in Horizontal Tubes," *International Journal of Heat and Mass Transfer*, Vol. 80, pp. 698-716.
192. Kharangate, C., Lee, H., and Mudawar, I., 2015, "Computational Modeling of Turbulent Evaporating Falling Film," *International Journal of Heat and Mass Transfer*, Vol. 81, pp. 52-62.
193. Konishi, C., Lee, H., Mudawar, I., Hasan, M.M., Nahra, H.K., Hall, N.R., Wagner, J.D., May, R.L., and Mackaey, J.R., 2015, "Flow Boiling in Microgravity: Part 1 – Interfacial Behavior and Experimental Heat Transfer Results," *International Journal of Heat and Mass Transfer*, Vol. 81, pp. 705-720.
194. Konishi, C., Lee, H., Mudawar, I., Hasan, M.M., Nahra, H.K., Hall, N.R., Wagner, J.D., May, R.L., and Mackaey, J.R., 2015, "Flow Boiling in Microgravity: Part 2 – Critical Heat Flux Interfacial Behavior, Experimental Data, and Model," *International Journal of Heat and Mass Transfer*, Vol. 81, pp. 721-736.
195. Mascarenhas, N., Lee H. and Mudawar, I., 2015, "Experimental and Computational Investigation of Interfacial Shear along Wavy Two-Phase Interfaces," *International Journal of Heat and Mass Transfer*, Vol. 85, pp. 265-280.

196. Lee, H., Kharangate, C.R., Mascarenhas, N., Park I., and Mudawar, I., 2015, "Experimental and Computational Investigation of Vertical Downflow Condensation," *International Journal of Heat and Mass Transfer*, Vol. 85, pp. 865-879.
197. Kim, S.M, Mudawar, I., 2015, "Review of Two-Phase Critical Flow Models and Investigation of the Relationship between Choking, Premature CHF, and CHF in Micro-Channel Heat Sinks," *International Journal of Heat and Mass Transfer*, Vol. 87, pp. 497-511.
198. Kharangate, C.R., O'Neill, L.E., Mudawar, I., Hasan, M.M., Nahra, H.K., Ramaswamy, B., Hall, N.R., Macner, A.M., and Mackey, J.R., 2015, "Flow Boiling and Critical Heat Flux in Horizontal Channel with One-sided and Double-sided Heating," *International Journal of Heat and Mass Transfer*, Vol. 90, pp. 323-338.
199. Kharangate, C.R., O'Neill, L.E., Mudawar, I., Hasan, M.M., Nahra, H.K., Ramaswamy, B., Hall, N.R., Macner, A.M., and Mackey, J.R., 2015, "Effects of Subcooling and Two-Phase Inlet on Flow Boiling Heat Transfer and Critical Heat Flux in a Horizontal Channel with One-sided and Double-sided Heating," *International Journal of Heat and Mass Transfer*, Vol. 91, pp. 1187-1205.
200. Kharangate, C.R., Konishi, C., and Mudawar, I., 2016, "Consolidated Methodology to Predicting Flow Boiling Critical Heat Flux for Inclined Channels in Earth Gravity and for Microgravity," *International Journal of Heat and Mass Transfer*, Vol. 92, pp. 467-482.
201. Lee, S., Mudawar, I., and Hasan, M.M., 2016, "Thermal Analysis of Hybrid Single-Phase, Two-Phase and Heat Pump Thermal Control System (TCS) for Future Spacecraft," *Applied Thermal Engineering*, pp. 190-214.
202. Kharangate, C.R., Lee, H., Park I., and Mudawar, I., 2016, "Experimental and Computational Investigation of Vertical Upflow Condensation in a Circular Tube," *International Journal of Heat and Mass Transfer*, Vol. 95, pp. 249-263.
203. Lee, S. and Mudawar, I., 2016, "Investigation of Flow Boiling in Large Micro-channel Heat Exchangers in a Refrigeration Loop for Space Applications," *International Journal of Heat and Mass Transfer*, Vol. 97, pp. 110-129.
204. Liang, G. and Mudawar, I., 2016, "Review of Mass and Momentum Interactions during Drop Impact on a Liquid Film," *International Journal of Heat and Mass Transfer*, Vol. 101, pp. 577-599.
205. O'Neill, L.E., Kharangate, C.R., and Mudawar, I., 2016, "Time-averaged and Transient Pressure Drop for Flow Boiling with Saturated Inlet Conditions," *International Journal of Heat and Mass Transfer*, Vol. 103, pp. 133-153.
206. Lee, S. and Mudawar, I., 2016, "Transient Characteristics of Flow Boiling in Large Micro-channel Heat Exchangers," *International Journal of Heat and Mass Transfer*, Vol. 103, pp. 186-202.
207. Kharangate, C.R., O'Neill, L.E., and Mudawar, I., 2016, "Effects of Two-Phase Inlet Quality, Mass Velocity, Flow Orientation, and Heating Perimeter on Flow Boiling in a Rectangular Channel: Part 1 – Two-Phase Flow and Heat Transfer Results," *International Journal of Heat and Mass Transfer*, Vol. 103, pp. 1261-1279.
208. Kharangate, C.R., O'Neill, L.E., and Mudawar, I., 2016, "Effects of Two-Phase Inlet Quality, Mass Velocity, Flow Orientation, and Heating Perimeter on Flow Boiling in a Rectangular Channel: Part 2 – CHF Experimental Results and Model," *International Journal of Heat and Mass Transfer*, Vol. 103, pp. 1280-1296.
209. Lee, S. and Mudawar, I., 2016, "Thermal and Thermodynamic Performance, and Pressure Oscillations of Refrigeration Loop employing Large Micro-channel Evaporators," *International Journal of Heat and Mass Transfer*, Vol. 103, pp. 1313-1326.
210. Liang, G. and Mudawar, I., 2017, "Review of Drop impact on Heated walls," *International Journal of Heat and Mass Transfer*, Vol. 106, pp. 103-126.
211. Park, I., O'Neill, L.E., and Mudawar, I., 2017, "Assessment of Body Force Effects in Flow Condensation, Part I: Experimental Investigation of Liquid Film Behavior for Different Orientations," *International Journal of Heat and Mass Transfer*, Vol. 106, pp. 295-312.

212. O'Neill, L.E., Park, I., Chirag R. Kharangate, C.R., V.S., Devahdhanush, Ganesan, V., and Mudawar, I., 2017, "Assessment of Body Force Effects in Flow Condensation, Part II: Criteria for Negating Influence of Gravity," *International Journal of Heat and Mass Transfer*, Vol. 106, pp. 313-328.
213. Kim, S.M and Mudawar, I., 2017, "Thermal Design and Operational Limits of Two-Phase Micro-channel Heat Sinks," *International Journal of Heat and Mass Transfer*, Vol. 106, pp. 861-876.
214. Kharangate, C.R. and Mudawar, I., 2017, "Review of Computational Studies on Boiling and Condensation," *International Journal of Heat and Mass Transfer*, Vol. 108, pp. 1164-1196.
215. Liang, G., Mascarenhas, N., and Mudawar, I., 2017, "Analytical and Experimental Determination of Slug Flow Parameters, Pressure Drop and Heat Transfer Coefficient in Micro-Channel Condensation," *International Journal of Heat and Mass Transfer*, Vol. 111, pp. 1218-1233.
216. Liang, G. and Mudawar, I., 2017, "Review of Spray Cooling – Part 1: Single-phase and Nucleate Boiling Regimes, and Critical Heat Flux," *International Journal of Heat and Mass Transfer*, Vol. 115, pp. 1174-1205.
217. Liang, G. and Mudawar, I., 2017, "Review of Spray Cooling – Part 2: High Temperature Boiling Regimes and Quenching Applications," *International Journal of Heat and Mass Transfer*, Vol. 115, pp. 1206-1222.
218. Lee, S., V.S., Devahdhanush, and Mudawar, I. 2018, "Pressure Drop Characteristics of Large Length-to-diameter Two-phase Micro-channel Heat Sinks," *International Journal of Heat and Mass Transfer*, Vol. 115, pp. 1258-1275.
219. Lee, S., V.S., Devahdhanush, and Mudawar, I. 2018, "Frequency Analysis of Pressure Oscillations in Large Length-to-Diameter Two-phase Micro-channel Heat Sinks," *International Journal of Heat and Mass Transfer*, Vol. 116, pp. 273-291.
220. Mudawar, I., 2017, "Flow Boiling and Flow Condensation in Reduced Gravity," *Advances in Heat Transfer*, Vol. 49, pp. 225-306.
221. Liang, G. and Mudawar, I., 2018, "Pool Boiling Critical Heat Flux (CHF) – Part 1: Review of Mechanisms, Models, and Correlations," *International Journal of Heat and Mass Transfer*, Vol. 117, pp. 1352-1367.
222. Liang, G. and Mudawar, I., 2018, "Pool Boiling Critical Heat Flux (CHF) – Part 2: Assessment of Models and Correlations," *International Journal of Heat and Mass Transfer*, Vol. 117, pp. 1368-1383.
223. O'Neill, L.E., Mudawar, I., Hasan, M.M., Nahra, H.K., Ramaswamy, B., Hall, N.R., Lokey, A. and Mackey, J.R., 2018, "Experimental Investigation into the Impact of Density Wave Oscillations on Flow Boiling System Dynamic Behavior and Stability," *International Journal of Heat and Mass Transfer*, Vol. 120, pp 144-166.
224. O'Neill, L.E., and Mudawar, I., 2018, "Mechanistic Model to Predict Frequency and Amplitude of Density Wave Oscillations in Vertical Upflow Boiling," *International Journal of Heat and Mass Transfer*, Vol. 123, pp. 143-171.
225. Lee, S., V.S., Devahdhanush, and Mudawar, I., 2018, "Investigation of Subcooled and Saturated Boiling Heat Transfer Mechanisms, Instabilities, and Transient Flow Regime Maps for Large Length-to-diameter Ratio Micro-channel Heat Sinks," *International Journal of Heat and Mass Transfer*, Vol. 123, pp. 72-191.
226. Liang, G. and Mudawar, I., 2018, "Review of Pool Boiling Enhancement with Additives and Nanofluids," *International Journal of Heat and Mass Transfer*, Vol. 124, pp. 423-453.
227. O'Neill, L.E., Mudawar, I., Hasan, M.M., Nahra, H.K., Ramaswamy, and Mackey, J.R., 2018, "Experimental Investigation of Frequency and Amplitude of Density Wave Oscillations in Vertical Upflow Boiling," *International Journal of Heat and Mass Transfer*, Vol. 125, pp. 1240-1263.
228. O'Neill, L.E., Mudawar, I., Hasan, M.M., Nahra, H.K., Ramaswamy, and Mackey, J.R., 2018, "Flow Condensation Pressure Oscillations at Different Orientations," *International Journal of Heat and Mass Transfer*, Vol. 127, pp. 784-809.
229. Liang, G. and Mudawar, I., 2019, "Review of Pool Boiling Enhancement by Surface Modification," *International Journal of Heat and Mass Transfer*, Vol. 128, pp. 892-933.
230. Hu, Y., Wang, J., Yang, J., Wang, Q., and Mudawar, I., 2019, "Experimental Study of Forced Convective Heat Transfer in Grille-Particle Composite Packed Beds," *International Journal of Heat and Mass Transfer*, Vol. 129, pp. 103-112.

231. Lee, S. and Mudawar, I., 2019, "Enhanced Model for Annular Flow in Micro-channel Heat Sinks, including effects of Droplet Entrainment/Deposition and Core Turbulence," *International Journal of Heat and Mass Transfer*, Vol. 133, pp. 510-530..
232. O'Neill, L.E., Ramaswamy, R., Nahra, H.K., Hasan, M.M., Mackey, J.R., and Mudawar, I., "Identification of Condensation Flow Regime at different Orientations using Temperature and Pressure Measurements," *International Journal of Heat and Mass Transfer*, in press.
233. Lee, J., O'Neill, L.E., Lee, S., and Mudawar, I., "Experimental and Computational Investigation on Two-Phase Flow and Heat Transfer of Highly Subcooled Flow Boiling in Vertical Upflow," *International Journal of Heat and Mass Transfer*, in review.
234. Liang, G. and Mudawar, I., "Review of Single-phase and Two-phase Nanofluid Heat Transfer in Macro-channels and Micro-channels," *International Journal of Heat and Mass Transfer*, in review.
235. Lee, S., V.S., Devahdhanush, and Mudawar, I., "Experimental and Analytical Investigation of Flow Loop Induced Instabilities in Micro-channel Heat Sinks," *International Journal of Heat and Mass Transfer*, in review.

IV. Conference Proceedings

1. Mudawwar, I. and El-Masri, M.A., 1984, "Thermal Design Constraints in Open Loop Water-Cooled Turbine Blades," ASME Paper 84-WA/HT-68 presented at the ASME Winter Annual Meeting, New Orleans, Louisiana.
2. Mudawwar, I. and El-Masri, M.A., 1985, "Experimental Investigation of Boiling Water Films in Radial Rotating Channels," *Proceedings of the Symposium on Transport Phenomena in Rotating Machinery*, pp. 226-240, Honolulu, Hawaii, 1985.
3. Shmerler, J.A. and Mudawwar, I., 1986, "Heat Transfer to Free-Falling Turbulent Liquid Films," *Proceedings of the Fourth Symposium on Energy Engineering Sciences*, Argonne National Laboratory, Argonne, Illinois, May 7-9.
4. Lee, C.H. and Mudawwar, I., 1986, "A New Critical Heat Flux Model for Subcooled Two-Phase Flow Through a Vertical Tube," *Proceedings of the 4th International Symposium on Multi-Phase Transport and Particulate Phenomena*, Miami, Florida, Dec. 15-17.
5. Shmerler, J.A. and Mudawwar, I., 1986, "Effects of Interfacial Waves on Heat Transfer to Free-Falling Turbulent Liquid Films," *Proceedings of the 4th International Symposium on Multi-Phase Transport and Particulate Phenomena*, Miami, Florida, Dec.15-17.
6. Koskie, J.E. Mudawwar, I., and Tiederman, W.G., 1986, "Characteristics of Interfacial Waves on Freely-Falling Liquid films," *Proceedings of the 4th International Symposium on Multi-Phase Transport and Particulate Phenomena*, Miami, Florida, Dec.15-17.
7. Mudawwar, I., Incropera, T.A., and Incropera, F.P., 1986, "Critical Heat Flux (CHF) in Falling Liquid Films," *Proceedings of the 4th International Symposium on Multi-Phase Transport and Particulate Phenomena*, Miami, Florida, Dec. 15-17.
8. Mudawwar, I., Incropera, T.A., and Incropera, F.P., "Microelectronic Cooling by Fluorocarbon Liquid Films", *Proceedings of the International Symposium on Cooling Technology for Electronic Equipment*, pp. 340-357, Honolulu, Hawaii, April 1987.
9. Grimley, T.A., Mudawwar, I., and Incropera, F.P., "Enhancement of Boiling Heat Transfer in Falling Films," *Proceedings of the 2nd ASME/JSME Thermal Engineering Conference*, Vol. 3, pp. 411-418, Honolulu, Hawaii, April 1987.
10. Marsh, W.J. and Mudawwar, I., "Effects of Surface Tension and Contact Angle on Sensible Heating and Boiling Incipience in Dielectric Falling Films," *ASME Proceedings of the 1988 National Heat Transfer Conference*, HTD-Vol. 96, H.R. Jacobs, ed., pp. 543-550, Houston, Texas, July 1988.
11. Maddox, D.E. and Mudawwar, I., "Single- and Two-Phase Convective Heat Transfer from Smooth and Enhanced Microelectronic Heat Sources in a Rectangular Channel," *ASME Proceedings of the 1988 National Heat Transfer Conference*, HTD-Vol. 96, H.R. Jacobs, ed., pp. 533-542, Houston, Texas, July 1988.

12. Anderson, T.M. and Mudawwar, I., "Microelectronic Cooling by Enhanced Pool Boiling of a Dielectric Fluorocarbon Liquid," *ASME Proceedings of the 1988 National Heat Transfer Conference*, HTD-Vol. 96, H.R. Jacobs, ed., pp. 551-560, Houston, Texas, July 1988.
13. Lee, C.H., Yin, S.T., Tain, R.M., Huang, Y.D., Chang, C.J., Lin, J.T., and Mudawwar, I., 1988, "A Study of Critical Heat Flux at INER," *Proceedings of the Third International Topical Meeting on Nuclear Power Plant Thermal Hydraulics and Operations*, Vol. A2, pp. 55-62, Seoul, Korea.
14. Mudawwar, I., "Boiling Incipience in Wavy Falling Liquid Films," *Proceedings of the Seventh Symposium on Energy Engineering Sciences*, Argonne National Laboratory, pp. 9-16, Argonne, Illinois, June 19-21, 1989.
15. Mudawwar, I. and Anderson, T.M., 1989, "High Flux Electronic Cooling by Means of Pool Boiling-Part I: Parametric Investigation of the Effects of Coolant Variation, Pressurization, Subcooling and Surface Augmentation," *Heat Transfer in Electronics*, 1989 National ASME/AIChE Heat Transfer Conference, Philadelphia, August 1989, HTD-Vol. 111, R.K. Shah, ed., pp. 25-34.
16. Mudawwar, I. and Anderson, T.M., 1989, "High Flux Electronic Cooling by Means of Pool Boiling-Part II: Optimization of Enhanced Surface Geometry," *Heat Transfer in Electronics*, 1989 National ASME/AIChE Heat Transfer Conference, Philadelphia, August 1989, HTD-Vol. 111, R.K. Shah, ed., pp. 35-50.
17. Mudawwar, I. and Maddox, D.E., 1989, "Enhancement of Critical Heat Flux From High Power Microelectronic Heat Sources in a Flow Channel," *Heat Transfer in Electronics*, 1989 National ASME/AIChE Heat Transfer Conference, Philadelphia, August 1989, HTD-Vol. 111, R.K. Shah, ed., pp. 51-58.
18. Galloway, J.E. and Mudawwar, I., 1989, "Boiling Heat Transfer from a Simulated Microelectronic Heat Source to a Dielectric Liquid Film Driven by a Rotating Stirrer," *Heat Transfer in Electronics*, 1989 National ASME/AIChE Heat Transfer Conference, Philadelphia, August 1989, HTD-Vol. 111, R.K. Shah, ed., pp. 67-78.
19. Wadsworth, D. and Mudawwar, I., 1989, "Cooling of a Multichip Electronic Module by Means of Confined Two-Dimensional Jets of Dielectric Liquid," *Heat Transfer in Electronics*, 1989 National ASME/AIChE Heat Transfer Conference, Philadelphia, August 1989, HTD-Vol. 111, R.K. Shah, ed., pp. 79-87.
20. Willingham, T.C., Gersey, C.O., and Mudawwar, I., 1991, "Forced Convection Boiling from an Array of In-Line Heat Sources in a Flow Channel," *Proceedings of the ASME/JSME Thermal Engineering Joint Conference*, Reno, Nevada, Vol. 2, J.R. Lloyd and Y. Kurosaki, eds., pp. 365-374.
21. Galloway, J.E. and Mudawwar, I., 1991, "Flow Boiling Heat Transfer from Simulated Microelectronic Chips and Cold Plates in the Presence of Stream-Wise Curvature," *Proceedings of the ASME-JSME Thermal Engineering Joint Conference*, Reno, Nevada, Vol. 2, J.R. Lloyd and Y. Kurosaki, eds., pp. 381-391.
22. Mudawwar, I., "Direct-Immersion Cooling for High Power Electronic Chips," *Proceedings of I-Therm III: Intersociety Conference on Thermal Phenomena in Electronic Systems*, Austin, Texas, February 3-5, 1992, pp. 74-84.
23. Gersey, C.O., Willingham, T.C., and Mudawwar, I., "Design Parameters and Practical Considerations in the Two-Phase Forced-Convection Cooling of Multi-Chip Modules," *Advances in Electronic Packaging 1992- Proceedings of the 1992 Joint ASME-JSME Conference on Electronic Packaging*, Milpitas, California, April 9-12, Vol. 1, pp. 111-122.
24. Gersey, C.O. and Mudawwar, I., "Effects of Orientation on Critical Heat Flux from Chip Arrays during Flow Boiling," *Advances in Electronic Packaging 1992- Proceedings of the 1992 Joint ASME-JSME Conference on Electronic Packaging*, Milpitas, California, April 9-12, Vol. 1, pp. 123-134.
25. Wadsworth, D.C. and Mudawwar, I., "Enhancement of Single-Phase Heat Transfer and Critical Heat Flux from an Ultra-High-Flux Simulated Microelectronic Heat Source to a Rectangular Impinging Jet of Dielectric Liquid," *Advances in Electronic Packaging 1992- Proceedings of the 1992 Joint ASME-JSME Conference on Electronic Packaging*, Milpitas, California, April 9-12, Vol. 1, pp. 143-151.
26. Morgan, R., Langford, J., and Mudawwar, I., "Advanced Electronic Packaging Utilizing Direct-Immersion Liquid Two-Phase Forced Convection and High Specific-Property Composite Materials," *Proceedings of the National Electronic Packaging and Production (NEPCON) Conference*, Boston, Massachusetts, June 1992.

27. Gersey, C.O. and Mudawar, I., "Orientation Effects on Critical Heat Flux from Discrete, In-Line Heat Sources in a Flow Channel," ASME Paper 93-HT-26, presented at the 1993 National Heat Transfer Conference, Atlanta, Georgia, August 1993.
28. Galloway, J.E. and Mudawar, I., "A Mechanistic View of the CHF Enhancement effect attributed to Flow Curvature," *ANS Proceedings of the 1993 National Heat Transfer Conference*, Atlanta, Georgia, August 1993, pp. 9-21.
29. Bowers, M.B. and Mudawar, I., "Two-Phase Electronic Cooling using Mini-Channel and Micro-Channel Heat Sinks-Part 1. Design Criteria and Heat Diffusion Constraints," *Advances in Electronic Packaging 1993: Proceedings of ASME International Electronic Packaging Conference*, Vol. 2, Binghamton, New York, September 29-October 2, 1993, pp. 693-702.
30. Bowers, M.B. and Mudawar, I., "Two-Phase Electronic Cooling using Mini-Channel and Micro-Channel Heat Sinks-Part 2. Flow Rate and Pressure Drop Constraints," *Advances in Electronic Packaging 1993: Proceedings of ASME International Electronic Packaging Conference*, Vol. 2, Binghamton, New York, September 29-October 2, 1993, pp. 703-712.
31. Mudawar, I., Jimenez, P.E., and Morgan, R.E., "Immersion-Cooled Standard Electronic Clamshell Module: A Building Block for Future High-Flux Avionics Systems," *Advances in Electronic Packaging 1993: Proceedings of ASME International Electronic Packaging Conference*, Vol. 2, Binghamton, New York, September 29-October 2, 1993, pp. 847-858.
32. Hall, D.D. and Mudawar, I., "Prediction of Mechanical Properties of Complex-Shaped Aluminum Parts Subjected to Spray Quenching," *Thermal Processing of Materials: Thermo-Mechanics, Controls and Composites-Proceedings of the 1994 ASME Winter Annual Meeting*, Chicago, HTD-Vol. 289, ASME, pp. 7-19, 1994.
33. Bernardin, J.D. and Mudawar, I., "An Experimental Investigation into the Relationship between Temperature-Time History and Surface Roughness in the Spray Quenching of Aluminum Parts," *Thermal Processing of Materials: Thermo-Mechanics, Controls and Composites-Proceedings of the 1994 ASME Winter Annual Meeting*, Chicago, HTD-Vol. 289, ASME, pp. 63-71, 1994.
34. Estes, K.A. and Mudawar, I., "Comparison of Two-Phase Electronic Cooling using Free Jets and Sprays," *Advances in Electronic Packaging 1995: Proceedings of International Intersociety Electronic Packaging Conference- INTERpack '95*, EEP-Vol. 10-2, Lahaina, Hawaii, March 1995, pp. 975-988.
35. Johns, M.E. and Mudawar, I., "An Ultra-High Power Two-Phase Jet-Impingement Avionic Clamshell Module," *Advances in Electronic Packaging 1995: Proceedings of International Intersociety Electronic Packaging Conference- INTERpack '95*, EEP-Vol. 10-2, Lahaina, Hawaii, March 1995, pp. 957-968.
36. Mudawar, I., Galloway, J.E., Gersey, C.O., and Reed, S.J., "Theoretical Modeling of CHF for Near-Saturated Pool Boiling and Flow Boiling from Short Heaters using the Interfacial Lift-off Criterion," *Proceedings of International Conference on Convective Flow Boiling*, Banff, Canada, April-May 1995.
37. Mudawar, I. and Estes, K.A., "Modeling of Hydrodynamic Parameters and Critical Heat Flux in Spray Cooling," *Proceedings of International Conference on Convective Flow Boiling*, Banff, Canada, April-May 1995.
38. Mudawar, I. and Bowers, M.B., "Parametric Study of Ultra-High CHF in Highly Subcooled Water Flow Inside Small Diameter Tubes," *Proceedings of International Conference on Convective Flow Boiling*, Banff, Canada, April-May 1995.
39. Mudawar, I., Galloway, J.E., Gersey, C.O., Reed, S.J., and Hall, D.D., "Theoretical Modeling of CHF for Near-Saturated Pool Boiling and Flow Boiling from Short Heaters using the Interfacial Lift-off Criterion," *Proceedings of Thirteenth Symposium on Energy Engineering Sciences*, Argonne, Illinois, May 1995, pp. 67 - 82.
40. Morgan, R.E., Ehlers, S.L. and Mudawar, I., "Advanced Composite Materials and Subcooled Liquid Change-of-Phase (COP) Cooling for Thermal Management in Advanced Electronic Systems," *Proceedings of 41st International SAMPE Symposium*, Anaheim, California, March 25-28, 1996.

41. Hall, D.D. and Mudawar, I., "Evaluation of Subcooled CHF Correlations using the PU-BTPFL CHF Database for Vertical Upflow of Water in a Uniformly Heated Round Tube," *Proceedings of 1996 National Heat Transfer Conference*, Houston, Texas, August 3-6, 1996.
42. Hall, D.D., Mudawar, I., Morgan, R.E. and Ehlers, S.L., "Validation of a Systematic Approach to Modeling Spray Quenching of Aluminum Alloy Extrusions, Composites, and Continuous Castings," *Proceedings 2nd International Conference on Quenching and the Control of Distortion*, Cleveland, Ohio, November 4-7, 1996, pp. 473-487.
43. Mudawar, I., "Critical heat flux in Small Diameter Channels," *Proceedings of Sixteenth Symposium on Energy Engineering Sciences*, Argonne, Illinois, May 1998, pp. 58 - 70.
44. Mudawar, I., "Assessment of High-Heat-Flux Thermal Management Schemes," *Proceedings of I-Therm 2000: International Conference on Thermal, Mechanics and Thermomechanical Phenomena in Electronic Systems*, Vol. 1, Las Vegas, Nevada, May 23-26, 2000, pp. 1-20.
45. Mudawar, I., "High-Heat-Flux Liquid Cooling Schemes," *Proceedings of Manufacturing Test Research Symposium 2000*, Intel Corporation, Hillsboro, Oregon, August 24, 2000.
46. Bernardin, J.D. and Mudawar, I., "Theoretically-Based Leidenfrost point Model," HTD-Vol. 366-4, J.H. Kim Editor, ASME, pp. 11-20, 2000.
47. Howard, A. and Mudawar, I., "Pool Boiling Critical Heat Flux on a Downward-facing Convex Surface," HTD-Vol. 366-4, J.H. Kim Editor, ASME, pp. 21-29, 2000.
48. Mudawar, I. and Qu, W., "High-Heat-Flux Miniature Heat Sinks," *Proceedings of Nineteenth Symposium on Energy Engineering Sciences*, Argonne, Illinois, May 2001, pp. 259-279.
49. Qu, W. and Mudawar, I., "Thermal Design Methodology for High-Heat-Flux Single-Phase and Two-Phase Micro-Channel Heat Sinks," *Proceedings of I-Therm 2002: International Conference on Thermal, Mechanics and Thermomechanical Phenomena in Electronic Systems*, San Diego, California, May 29-June 1, pp. 347-359, 2002.
50. Mukherjee, S. and Mudawar, I., "Smart, Low-Cost, Pumpless Loop for Micro-Channel Electronic Cooling using Flat and Enhanced Surfaces," *Proceedings of I-Therm 2002: International Conference on Thermal, Mechanics and Thermomechanical Phenomena in Electronic Systems*, San Diego, California, May 29-June 1, 2002, pp. 360-370, 2002.
51. Mudawar, I., Zhang, H., and Hasan, M.M., "Investigation of Body Force Effects on Flow Boiling Critical Heat Flux," *Proceedings of Sixth Microgravity Fluid Physics and Transport Phenomena Conference*, Cleveland, OH, August 14-15, Vol. 1, pp. 553-578, 2002.
52. Qu, W. and Mudawar, I., "Transport Phenomena in Two-Phase Micro-Channel Heat Sinks," *IMECE 2002-33711, Proceedings of the ASME Heat Transfer Division - 2002*, Y. Bayazitoglu, H.S. Cameron, eds, ASME, New York, NY, HTD-Vol. 372-7, pp. 135-147, 2002.
53. Lee, S.Y., Wereley, S.T., Gui, L., Qu, W., and Mudawar, I., "Microchannel Flow Measurements using Micro Particle Image Velocimetry," *IMECE 2002-33682, Proceedings of the ASME Fluids Engineering Division - 2002*, A. Ogut, ed., ASME, New York, NY, FED-Vol. 258, pp. 493-500, 2002.
54. Zhang, H., Mudawar, I., and Hasan, M.M., "Photographic Study of Orientation Effects on Near-Saturated Flow Boiling," *IMECE 2002-39063, Proceedings of the ASME Heat Transfer Division - 2002*, Y. Bayazitoglu, H.S. Cameron, eds, ASME, New York, NY, HTD-Vol. 372-3, pp. 187-197, 2002.
55. Bernardin, J.D. and Mudawar, I., "A Leidenfrost Point Model for Impinging Droplets and Sprays," 6th ASME-JSME Thermal Engineering Joint Conference, Hawaii Island, Hawaii, March 16-20, 2003.
56. Qu, W., Yoon, S.-M., and Mudawar, I., "Two-Phase Flow and Heat Transfer in Rectangular Micro-Channels," 2003 ASME Summer Heat Transfer Conference, July 21-23, Las Vegas, Nevada.
57. Zhang, J., Hugenroth, J., Mudawar, I. and Fisher, T.S., "Parametric Study of a Thermosyphon Loop Pressure Drop Model, IMECE2004-60251, Nov. 2004, Anaheim, CA.
58. Mudawar, I., Zhang, H., and Hasan, M.M., "Flow Boiling Critical Heat Flux in Reduced Gravity," *Proceedings of Conference-Workshop on Strategic Research to Enable NASA's Exploration Missions*, Cleveland, OH, Jun. 22-23, 2004.

59. Mudawar, I. and Lee, J., "Micro-Channel Refrigeration Cooling," Direct Energy Conversion Workshop, Coronado, CA, Dec. 13-15, 2004.
60. Mudawar, I., Lee, J. and Sung M., "Implementation of Micro-Channel Evaporator for High-Heat-Flux Refrigeration Cooling Applications," Office of Naval Research (ONR) Thermal Management Review, Oct. 26-28, Orlando, FL, 2005.
61. Ujereh, S., Mudawar, I. Amama, P. and Fisher, T.S., "Enhanced Pool Boiling using Carbon Nanotube Arrays on a Silicon Surface," International Mechanical Engineering Congress and Exposition, IMECE2005-80065, Nov. 2005, Orlando.
62. Bernardin, J.D. and Mudawar, I., "Transition Boiling Heat Transfer of Droplets Streams and Sprays," International Mechanical Engineering Congress and Exposition, IMECE2005-79351, Nov. 2005, Orlando, FL.
63. Mudawar, I., "In Search of Optimum Format for Capstone Design Courses," International Mechanical Engineering Congress and Exposition," IMECE2005- 82587, Nov. 2005, Orlando, FL.
64. Mudawar, I., "Flow Boiling in Microgravity," in "Forum on Multiphase Flow relating to Space Power, Propulsion, and Advanced Life Support Systems," International Mechanical Engineering Congress and Exposition, IMECE2005-80940, Nov. 2005, Orlando, FL.
65. Ujereh, S., Mudawar, I. and Fisher, T., "Effects of Carbon Nanotube Array Patterning on Nucleate Pool Boiling," International Heat Transfer Conference, Sydney, Australia, Aug. 13-18, 2006.
66. Zheng, Y., Velagapudi, V., Fisher, T.S., Mudawar, I. and Gore, J.P., "Thermal Management Analysis of On-Board High-Pressure Metal Hydride Systems, International Mechanical Engineering Congress and Exposition, IMECE2006-14080, Chicago, IL, Nov. 2006.
67. Smith, K.C., Zhang, Y., Fisher, T.S., Mudawar, I., Pourpoint, T.L., "Simulation of High-Pressure Metal Hydride Systems," 19th National and 8th ISHMT-ASME Heat and Mass Transfer Conference, January 3-5, 2008, JNTU Hyderabad, India.
68. Sung, M.K. and Mudawar, I., "Single-Phase and Two-Phase Hybrid Cooling Schemes for High-Heat-Flux Thermal Management of Defense Electronics," Proceedings of ITherm 2008: International Conference on Thermal, Mechanics and Thermomechanical Phenomena in Electronic Systems, Orlando, FL, May 28-31, 2008, pp. 121-131.
69. Lee, J. and Mudawar, I., "Low-Temperature Two-Phase Micro-Channel Cooling for High-Heat-Flux Thermal Management of Defense Electronics," Proceedings of ITherm 2008: International Conference on Thermal, Mechanics and Thermomechanical Phenomena in Electronic Systems, Orlando, FL, May 28-31, 2008, pp. 132-144.
70. Visaria, M. and Mudawar, I., "Application of Two-Phase Spray Cooling for Thermal Management of Electronic Devices," Proceedings of ITherm 2008: International Conference on Thermal, Mechanics and Thermomechanical Phenomena in Electronic Systems, Orlando, FL, May 28-31, 2008, pp. 275-283.
71. Zhang, H. and Mudawar, I., "Application of Flow Boiling for Thermal Management of Electronics in Microgravity and Reduced Gravity Space Systems," Proceedings of ITherm 2008: International Conference on Thermal, Mechanics and Thermomechanical Phenomena in Electronic Systems, Orlando, FL, May 28-31, 2008, pp. 949-959.
72. Mudawar, I., Bharathan, D., Kelly, K. and Narumanchi, S., "Two-Phase Spray Cooling of Hybrid Vehicle Electronics," Proceedings of ITherm 2008: International Conference on Thermal, Mechanics and Thermomechanical Phenomena in Electronic Systems, Orlando, FL, May 28-31, 2008, pp. 1210-1221.
73. Khanikar, V., Mudawar, I. and Fisher, T., "Flow Boiling in a Micro-Channel Coated with Carbon Nanotubes," Proceedings of ITherm 2008: International Conference on Thermal, Mechanics and Thermomechanical Phenomena in Electronic Systems, Orlando, FL, May 28-31, 2008, pp. 960-969.
74. Mudawar, I., "Two-Phase Micro-Channel Heat Sinks: Theory, Applications and Limitations," Proceedings of ASME/JSME 2011 8th Thermal Engineering Conference, Honolulu, HI, March 13-17, 2011, Paper No. AJTEC2011-44005.
75. Lee, H., Park, I., Konishi, C., Mudawar, I., May, R.I., Juergens, J.R., Wagner, J.D., Hall, N.R., Nagra, H.K., Hasan, M. and Jeffrey R. Mackey, J.R., "Experimental Investigation of Flow Condensation in Microgravity,"

- ASME 2013 Summer Heat Transfer Conference, Minneapolis, MN, July 14-19, 2013, Paper No. ASME HT2013-17045.
76. Mudawar, I., "Recent Advances in High-Flux, Two-Phase Thermal Management," ASME 2013 Summer Heat Transfer Conference, Minneapolis, MN, July 14-19, 2013, Paper No. ASME HT2013-17046.
 77. Mudawar, I., "Criteria for Negating Influence of Gravity on Flow Boiling Critical Heat Flux in Space Systems," 9th International Conference on Two-Phase Systems for Space and Ground Applications, Baltimore, MD, September 22-26, 2014.
 78. Mackey, J.R., Hall, N.R., Hasan, M.M., Wagner, J.D., Nahra, H.K., May, R.L., Butcher, R.L., Kolacz, J.S., Lee, H. Konishi, C., and Mudawar, I., "High-Speed Imaging System for Two-Phase Flow Research on the International Space Station," 9th International Conference on Two-Phase Systems for Space and Ground Applications, Baltimore, MD, September 22-26, 2014.
 79. Nahra, H.K., Hasan, M.M., Hall, N.R., Mackey, J.R., Wagner, J.D., May, R.L., Butcher, R.L., Kolacz, J.S., Balasubramanian, R., Lee, H. Konishi, C., and Mudawar, I., "Flow Boiling Critical Heat Flux Measurements in Reduced Gravity," 9th International Conference on Two-Phase Systems for Space and Ground Applications, Baltimore, MD, September 22-26, 2014.
 80. Hodson, S., McCarthy, P., Mudawar, I., "A Dynamic Two-Phase Component Model Library for High Heat Flux Applications," SAE 2019 AeroTech Americas Congress & Exhibition, Charleston, SC, March 26-28, 2019.

V. Conference Presentations

1. Mudawar, I. and Zhang, H., "Investigation of Critical Heat Flux in Reduced Gravity using Photomicrographic Techniques," Proceedings of Fifth Microgravity Fluid Physics and Transport Phenomena Conference, Cleveland, OH, August 9-11, 2000.
2. Mudawar, I., Zhang, H., and Hasan, M.M., "Investigation of Body Force Effects on Flow Boiling Critical Heat Flux," Proceedings for Abstracts of Sixth Microgravity Fluid Physics and Transport Phenomena Conference, Cleveland, OH, August 14-15, pp. 57-58, 2002.
3. Mudawar, I., "High-Flux Phase-Change Cooling Schemes," The Office of Naval Research Thermal Management Workshop, Arlington, Virginia, October 7-8, 2003.
4. Mudawar, I., "Implementation of Micro-Channel Evaporator for High-Heat-Flux Refrigeration Cooling applications," Office of Naval Research Direct Energy Conversion Workshop, San Diego, CA, December 13-15, 2004.
5. Mudawar, I., "Implementation of Micro-Channel Evaporator for High-Heat-Flux Refrigeration Cooling applications," Office of Naval Research Thermal Management Review, Orlando, FL, October 27-28, 2005.
6. Velagapudi, V., Pourpoint, T., Zheng, Y., Fishr, T.S., Mudawar, I., Smith, K., Meyer, S., Anderson, W., Gore, J., "Onboard Metal Hydride Storage System," Hydrogen Initiative Symposium, Purdue University, West Lafayette, IN, April 5-6, 2006.
7. Mudawar, I., "Micro-Channel Refrigeration Cooling," ONR Thermal Management Review, Berkeley, CA, September 18-20, 2006.
8. Mudawar, I., "High-Flux Thermal Management of Defense Systems," Air Force Research Laboratory Thermal Management Strategic Technology Workshop, Dayton, OH, March 29, 2007.
9. Mudawar, I., "Meeting the Challenges of High-Flux Thermal Management," Interagency Advanced Power Group (IAPG), Fort Belvoir, Alexandria, VA, May 8-10, 2007.
10. Mudawar, I., "Hybrid Micro-Channel/Jet-Impingement High-flux Cooling Scheme," ONR Thermal Management Review, Hilton Head, NC, September 25-27, 2007.
11. Mudawar, I. and Hasan, M.M., "Development of Flow Boiling and Condensation Experiment for the International Space Station," American Society for Gravitational and Space Research (ASGSR) 28th Annual Meeting, New Orleans, LA, November 28-December 2, 2012.

12. Mudawar, I. and Hasan, M.M., "Flow Boiling Critical Heat Flux in Reduced Gravity," American Society for Gravitational and Space Research (ASGSR) 28th Annual Meeting, New Orleans, LA, November 28-December 2, 2012.
13. Mudawar, I., Lee, H., Konishi, C., Kim, S.M., Hall, N., Hasan, M.M. and Nahra, H., "Flow Boiling and Condensation Experiment (FBCE) for the International Space Station– Predictive Tools," American Society for Gravitational and Space Research (ASGSR) 29th Annual Meeting, Orlando, FL, November 3-8, 2013.
14. Nahra, H.K., Hall, N., Hasan, M.M., Wagner, J., May, R., Mackey, J., Kolacz, J., Butcher, R., Frankenfield, B., Mudawar, I., Konishi, C., Lee, H., "Development of Flow Boiling and Condensation Experiment on the International Space Station I. Normal and Low Gravity Flow Boiling Experiment Development and Test Results," American Society for Gravitational and Space Research (ASGSR) 29th Annual Meeting, Orlando, FL, November 3-8, 2013.
15. Mudawar, I. Lee, H., Konishi, C., Hasan, M.M., Nahra, H.K., Hall, N.R., Wagner, J.D., May, R.L., Mackey, J.R., Butcher, R.L., and Kolacz, J.S., "Flow Boiling and Condensation Experiment (FBCE) for the International Space Station," American Society for Gravitational and Space Research (ASGSR) 30th Annual Meeting, Pasadena, CA, October 23-26, 2014.
16. Mudawar, I., Lee, S., and Hasan M.M., "Adaptable Single Active Loop Thermal Control System (TCS) for Future Space Missions," American Society for Gravitational and Space Research (ASGSR) 30th Annual Meeting, Pasadena, CA, October 23-26, 2014.
17. Mackey, J.R., Hall, N.R., Hasan, M.M., Wagner, J.D., Nahra, H.K., and Mudawar, I., "High Frame Rate PCIe/104 Imaging Systems for Scientific Research aboard the International Space Station," American Society for Gravitational and Space Research (ASGSR) 30th Annual Meeting, Pasadena, CA, October 23-26, 2014.
18. Mudawar, I., Kharangate, C., O'Neill, L.E., Konishi, C., Hasan, M.M., Nahra, H.K., Hall, N.R., May, R.L., Balasubramaniam, R., Mackey, J.R., "Flow Boiling and Condensation Experiment (FBCE) for the International Space Station," American Society for Gravitational and Space Research (ASGSR) 31st Annual Meeting, Alexandria, VA, November 11-14, 2015.
19. Mudawar, I., Lee, S., and Hasan M.M., "Adaptable Single Active Loop Thermal Control System (TCS) for Future Space Missions," American Society for Gravitational and Space Research (ASGSR) 31st Annual Meeting, Alexandria, VA, November 11-14, 2015.
20. Nahra, H.K., Hasan, M.M., Balasubramaniam, R., Patania, M., Hall, N., Wagner, J., Mackey, J., Frankenfield, B., Hauser, D., Harpster, G., Nawrocki, D., Clapper, R., Kolacz, J., Butcher, R., May, R., Chao, D., Mudawar, I., Kharangate, C.R., O'Neill, L., "Development and Capabilities of ISS Flow Boiling and Performance Evaluation of the International Space Station Flow Boiling and Condensation Experiment," American Society for Gravitational and Space Research (ASGSR) 31st Annual Meeting, Alexandria, VA, November 11-14, 2015.
21. Mackey, J.R., Hall, N.R., Hasan, M.M., Wagner, J.D., Nahra, H.K., and Mudawar, I., "High Frame Rate PCIe/104 Imaging Systems for Scientific Research aboard the International Space Station," American Society for Gravitational and Space Research (ASGSR) 31st Annual Meeting, Alexandria, VA, November 11-14, 2015.
22. Mudawar, I., O'Neill, L.E., Konishi, C., Hasan, M.M., Nahra, H.K., Hall, N.R., May, R.L., Balasubramaniam, R., Mackey, J.R., "Flow Boiling and Condensation Experiment (FBCE) for the International Space Station," American Society for Gravitational and Space Research (ASGSR) 32nd Annual Meeting, Cleveland, OH, October 26-29, 2016.
23. Hasan, M.M., Balasubramaniam, R., Nahra, H.K., Mackey, J., Wagner, J., Hall, N., Frankenfield, B., Harpster, G., May, R., Mudawar, I., Kharangate, C.R., O'Neill, L., Mudawar, Talmor, M., "Performance Evaluation of the International Space Station Flow Boiling and Condensation Experimental (FBCE) Test Facility," American Society for Gravitational and Space Research (ASGSR) 32nd Annual Meeting, Cleveland, OH, October 26-29, 2016.
24. Mudawar, I., O'Neill, L.E., Lee S., V.S. Devahdhanush, Ganesan V., Lee J., Hasan, M.M., Nahra, H.K., Balasubramaniam, R., Mackey, J.R., "Flow Boiling and Condensation Experiment (FBCE) for the International Space Station," American Society for Gravitational and Space Research (ASGSR) 33rd Annual Meeting, Seattle, WA, October 25-28, 2017.

25. Mudawar, I., "Direct Liquid Impingement Cooling of Power Electronics Substrates," Center of Excellence for Integrated Thermal Management of Aerospace Vehicles (CITMAV), Purdue University, West Lafayette, IN, September 5-6, 2018.
26. Mudawar, I., "Experimental and Theoretical Investigation into Prediction and Prevention of Two-phase Flow Instabilities in High-flux Micro-channel Heat Sinks," Center of Excellence for Integrated Thermal Management of Aerospace Vehicles (CITMAV), Purdue University, West Lafayette, IN, September 5-6, 2018.
27. O'Neill, L.E., Mudawar, I., Hasan, M.M., Nahra, H.K., Balasubramaniam, R., Mackey, J.R., "Experimental Investigation and Modeling of Density Wave Oscillations in Vertical Upflow Boiling," American Society for Gravitational and Space Research (ASGSR) 34th Annual Meeting, Washington, DC, October 29-November 3, 2018.
28. Nahra, H.K., Balasubramaniam, R., Hasan, M.M., Mackey, J.R., Mudawar, I., O'Neill, L.E., May, R.L., "Flow Boiling Experiments Using the Flow Boiling and Condensation Experiment (FBCE) Breadboard Test B," American Society for Gravitational and Space Research (ASGSR) 33th Annual Meeting, Washington, DC, October 29-November 3, 2018.
29. Mackey, J.R., Lant, C., O'Neill, L.E., Mudawar, I., Lokey, A., Hasan, M.M., Nahra, H.K., "Test Section Image Quality Characterization of Flow Boiling Module for Microgravity Experiment," American Society for Gravitational and Space Research (ASGSR) 34th Annual Meeting, Washington, DC, October 29-November 3, 2018.
30. O'Neill, L.E. and Mudawar, I., "Analysis of Temperature Rise and Peak Temperature Position during the CHF Transient for Subcooled Flow Boiling in 1-g and Microgravity," Gordon Research Conference on Micro and Nanoscale Phase Change Heat Transfer, Lucca (Barga), Italy, February 3-8, 2019.

GRADUATE STUDENTS:

Degrees Awarded

1. Incropera, Terri A., "Boiling Heat Transfer in Falling Films," MSME, May 1985.
2. Grimley, Terrence A., "Enhancement of Boiling in Falling Liquid Films," MSME, August 1985.
3. Shmerler, Jeffrey A., "A Study of Sensible Heating and Evaporation in Free-Falling Liquid Films," MSME, December 1986.
4. Lee, Chien-Hsiung, "A New Critical Heat Flux Model for Subcooled Two-Phase Flow Through a Vertical Tube," Ph.D., May 1987.
5. Koskie, John E., "Interfacial Characteristics of Falling Liquid Films," MSME, December 1987.
6. Maddox, Douglas E., "Enhancement of Forced Convection Boiling from a Simulated Microelectronic Heat Source in a Rectangular Channel," MSME, May 1988.
7. Marsh, William J., "Predicting the Onset of Nucleate Boiling in Wavy Free-Falling Turbulent Liquids Films," MSME, August 1988.
8. Anderson, Timothy M., "Enhancement of Pool Boiling from a simulated Microelectronic Heat Source," MSME, December 1988.
9. Valentine, William S., "Heat Transfer to Water Sprays," MSME, December 1988.
10. Deiters, Thomas A., "Optimization of Spray Cooling for Aluminum Extrusions, Forgings, or Castings," MSME, December 1989.
11. Wadsworth, Derek C., "Single and Two-Phase Cooling of a Multichip Electronic Module by Means of Confined Two-Dimensional Jets of Dielectric Liquid," MSME, May 1990.
12. Lyu, Tae-Hwan, "Interfacial Wave Effects on Heat Transfer to a Falling Liquid Film," Ph.D., May 1990.
13. Hought, Ronald A., "One and Two Component Velocity and Simultaneous Film Thickness Measurements in Smooth and Wavy Falling Liquid Films," MSME, May 1991.
14. Willingham, Thomas C., "Forced Convection Boiling and Critical Heat Flux From a Linear Array of Discrete Heat Sources," MSME, August 1991.

15. Klinzing, William P., "Development of Spray Quenching Test Bed and Correlations for Film Boiling in Water Sprays," MSME, December 1991.
16. Rozzi, Jay C., "Quenching of Aluminum Parts having Irregular Geometries using Multiple Water Sprays," MSME, December 1991.
17. Galloway, Jesse E., "Critical Heat Flux Enhancement in the Presence of Stream-Wise Curvature," Ph.D., December 1991.
18. Bernardin, John D., "Intelligent Heat Treatment of Aluminum Alloys: Material, Surface Roughness, and Droplet-Surface Interaction Characteristics," MSME, May 1993.
19. Jimenez, Peter E., "Immersion Cooled Standard Electronic Clamshell Modules for Future Aircraft Avionics," MSME, December 1993.
20. Gersey, Christopher O., "Effects of Orientation and Heater Length on Critical Heat Flux from Discrete and Continuous Heaters," Ph.D., December 1993.
21. Hall, David D., "A Method of Predicting and Optimizing the Thermal History and resulting Mechanical Properties of Aluminum Alloy Parts subjected to Spray Quenching," MSME, December 1993.
22. Estes, Kurt A., "Critical Heat Flux in Spray Cooling and Jet Impingement Cooling of Small Targets," MSME, May 1994.
23. Johns, Murray E., "Application of Jet Impingement Boiling in an Ultra-High Power Avionic Clamshell Module," MSME, May 1994.
24. Bowers, Morris B., "High Heat-Flux Dissipation using Small Diameter Channels," Ph.D., December 1994.
25. Bernardin, John D., "Leidenfrost Point and Film Boiling Heat Transfer of Single Droplets and Sprays," Ph.D., August 1996.
26. Reed, Stanley J., "Elimination of Boiling Incipience Temperature Drop and Enhancement of Boiling Heat Transfer in Highly Wetting Fluids through Low Contact Force Attachments," MSME, December 1996.
27. Lethander, Andrew T., "Measurement and Analysis of the Thermal Performance of an Avionics Cooling System," MSME, December 1997.
28. Sturgis, J. Christopher, "Single- and Two-Phase Heat Transfer Enhancement in a Curved, Rectangular Channel Subjected to Concave Heating," Ph.D., May 1998.
29. Caillat, Frederic F., "Structural and Thermal Design of an Avionics Cooling System using Two-Phase Jet Impingement," MSME, May 1998.
30. Howard, Alicia A., "Effects of Orientation and Downward-Facing Convex Curvature on Pool Boiling Critical Heat Flux," Ph.D., May 1999.
31. Hall, David D., "Critical Heat Flux in Subcooled Flow Boiling," Ph.D., August 1999.
32. LaClair, Timothy J., "Pre- and Post-Boiling Nucleation Thermal and Fluid Flow Transients During the Startup of Capillary Pumped Loops," Ph.D., May 2000.
33. Tope, Terry E., "Experimental Assessment of Flow Boiling CHF Mechanism," MSME, May 2001.
34. Mukherjee, Swaraj, "Smart, Low-Cost, Pumpless Loop for Micro-Channel Electronic Cooling using Flat and Enhanced Surfaces," MSME, May 2002.
35. Zhang, Hui, "Experimental and Theoretical Assessment of Flow Boiling CHF in Reduced Gravity using Different Flow Channel Orientations in 1-g Ground-Based Experiments," MSME, May 2002.
36. Meyer, Michael T., "High-Flux Rectangular Jet-Impingement Cooling," MSME, May 2004.
37. Qu, Weilin, "Transport Phenomena in Single-Phase and Two-Phase Micro-Channel Heat Sinks," Ph.D., August 2004.
38. Kibbey, Tim P., "Impinging Jets for Application in High-Mach Aircraft Thermal Management," MSAAE, December 2004.
39. Lee, Jaeseon, "Implementation of Micro-Channel Evaporator for High-Heat-Flux Refrigeration Cooling Applications," MSME, December 2004.

40. Rybicki, Jon, "Single-Phase and Two-Phase Cooling Characteristics of Upward-Facing and Downward-Facing Sprays, MSME, May 2005.
41. Wen, Chang-Da, "Emissivity Characteristics of Aluminum Alloy Surfaces and Assessment of Multispectral Radiation Thermometry (MRT) Emissivity Models," Ph.D., August 2005.
42. Ujereh, Sebastine Jr., "Effect of Carbon Nanotube Arrays on Nucleate Boiling Heat Transfer," MSME, August 2006.
43. Zhang, Hui, "Flow Boiling Critical heat Flux in Microgravity," Ph.D., December 2006.
44. Visaria, Milan K., "Theoretical and Experimental Study of the Effects of Spray Inclination on Two-Phase Spray Cooling and Critical Heat Flux," MSME, December 2006.
45. Bares, Geoffrey C., "Modeling of Condensing Two-Phase Annular Flow in Variable Gravity," MSME, December 2007.
46. Velagapudi, Varsha, "Thermal Management of Metal Hydride Systems for Hydrogen Storage Applications," MSME, December 2007.
47. Lee, Jaeseon, "Investigation of Subcooled Boiling in Micro-channel Heat sink for Indirect Refrigeration Cooling Applications," Ph.D., May 2008.
48. Sung, Myung Ki, "Low Temperature Hybrid Micro-Channel/Micro-Jet Impingement Cooling," Ph.D., May 2008.
49. Khanikar, Vikash, "Effects of Carbon Nanotube Coating on Flow Boiling in a Micro-channel," MSME, December 2008.
50. Park, Il-Chung, "Experimental and Analytical Investigations of Fluid Condensation on a Vertical Tube," MSME, December 2008.
51. Nacke, Robert A., "Air-To-Fuel Heat Exchanger for High Mach Flow Turbine Engines," MSME, August 2009.
52. Mascarenhas, Nikhin H., "Analytical and Computational Methodology for Modeling Spray Quenching of Alloy Cylinders and Tubes," MSME, August 2010.
53. Northcutt, Brittany, A., "Optimization of Cross-Flow Micro-Channel Heat Exchanger Module for Application in High Mach Aircraft Gas Turbine Engines," MSME, August 2010.
54. Kim, Joseph, "Experimental Analysis of High-Flux Microchannel Condensation," MSME, May 2011.
55. Visaria, Milan, "Design and Analysis of Heat Exchangers for High Pressure Metal Hydride Hydrogen Storage," Ph.D., May 2011.
56. Lee, Hyoung-Soon, "Comprehensive Design Methodology for Finned Air-Cooled Condensers and Spray Cooling," MSME, May 2011.
57. Kharangate, Chirag R., "Photographic Study and Modeling of Critical Heat Flux in Horizontal Flow and Vertical Upflow Boiling with Inlet Vapor Void," MSME, August 2011.
58. Kim, Sung-Min, "Universal Predictive Tools for Two-Phase Pressure Drop and Heat Transfer in Boiling and Condensing Mini/Micro-Channel Flows," Ph.D., August 2012.
59. Lee, Hyoungsoon, "Experimental, Theoretical and Computational Investigation of Flow Boiling and Condensation in Earth's gravity and Microgravity," Ph.D., August 2014.
60. Konishi, Christopher A., "Investigation of the Influence of Gravitational Body Force Effects on Critical Heat Flux for Flow Boiling with Subcooled and Two-phase Inlet," Ph.D., August 2014.
61. Mascarenhas, Nikhin, "Study of Interfacial Characterization and Heat Transfer in Turbulent Two-Phase Flows," Ph.D., August 2014.
62. Park, Ilchung, "Effects of Flow Orientation on Condensation in Tubes,," Ph.D., December 2014.
63. O'Neill, Lucas E., "Analysis of Body Force Effects on Flow Boiling and Condensation with Finite Inlet Quality," MSME, May 2016.
64. Kharangate, Chirag R., "Experimental, Theoretical and Computational Modeling of Flow Boiling, Flow Condensation and Evaporating Falling Films," Ph.D., August 2016.

65. Lee Seunghyun, "Analytical and Experimental Investigation of Future Hybrid Thermal Control System," Ph.D., August 2017.
66. Ganesan, Ganesan, "Development of a Finite Volume General Two-Phase Navier-Stokes Solver for Direct Numerical Simulations on Cut-Cells with Sharp Fixed Interface," MSME, May 2018.

Visiting Scholars

1. Gu, C., Associate Professor, Tsing Hua University, China, 1988.
2. Hung, Andrew Y., National Tsing Hua University, Taiwan, Republic of China, 1990-1991.
3. Dr. Yoon, Seok-Mann, Korea Science and Engineering Foundation (KOSEF), Taejon, Korea, 2000-2003.
4. Dr. Kim, Yeung Chan, Andong National University, Andong, Korea, 2005-2006.

Current Research Team

1. Cai, Chang (Ph.D. candidate, Visiting Scholar)
2. Devahdhanush, V.S. (Ph.D. candidate)
3. Ganesan, Ganesan (Ph.D. candidate)
4. Lee, Jeongmin (Ph.D. candidate)
5. Lee, Seunghyun (Post Doc)
6. Lei, Yuchuan (Ph.D. candidate, Visiting Scholar)
7. Liang, Gangtao (Professor, Visiting Scholar)
8. O'Neill, Lucas (Ph.D. candidate)

RESEARCH GRANTS AND CONTRACTS:

1. "Heat Transfer to Turbulent Liquid Films," Faculty Assistance Grant, AMOCO Oil Company, Chicago, Illinois, Aug. 1984 - Dec. 1987, \$60,000.
2. "Feasibility of Using Free-Falling Fluorocarbon Liquid Films to Cool Simulated Electronic Heat Dissipating Surfaces," IBM Data Systems Division, Poughkeepsie, New York, Jan. 1985-Dec. 1985, \$91,000 (with Prof. F. P. Incropera).
3. "Heating and Evaporation of Turbulent Liquid Films," U.S. Dept. of Energy, Office of Basic Energy Sciences, July 1985-June 1989, \$455,000.
4. "Feasibility of Using Free-Falling Fluorocarbon Liquid Films and Boiling Augmentation to Cool Simulated Electronic Heat Dissipating Surfaces," IBM Data Systems Division, Poughkeepsie, New York, Jan. 1986-Dec. 1986, \$87,000.
5. "Feasibility of Using a Rotating Phase Separator for Cooling Large-Scale Digital Computers," David Ross Grant, Purdue Research Foundation, Oct. 1986-Sep. 1987, \$14,775.
6. "Intelligent Control of Coupled Aluminum Extrusion and Heat Transfer," Purdue University Research Center on Intelligent Manufacturing Systems, Sep. 1986-Aug. 1989, \$180,000.
7. "Feasibility of Using Surface Enhancement in Pool and Flow Boiling to Cool Simulated Electronic Heat Dissipating Surfaces," IBM Data Systems Division, Poughkeepsie, New York, Jan. 1987-Dec. 1987, \$123,400.
8. "High Power Density Multichip Cooling Modules for Large Digital Computers," National Science Foundation, Aug. 1987-Jul. 1989, \$110,094.
9. "Computer System for Aluminum Spray Cooling Project," ALCOA, Lafayette, Indiana, June 1988, \$5,000.
10. "Parametric Study of Flow Boiling CHF on Multiple, In-Line Heat Sources," 3M Company, St. Paul, Minnesota, Jan. 1989-Dec. 1991, \$325,000.

11. "High-Speed Video Imaging System for a Two-Phase Flow Velocity/Interfacial Boundary Analyzer," U.S. Department of Energy, Sep. 1989-Sep. 1991, \$100,690.
12. "Intelligent Control of Heat Transfer from Aluminum Extrusions and Forgings: A Feasibility Study," Purdue University Research Center on Intelligent Manufacturing Systems, Sep. 1989-Aug. 1990, \$67,500.
13. "Materials Processing Test Bed," Purdue University Research Center on Intelligent Manufacturing Systems, Sep. 1990-Aug. 1992, \$170,000.
14. "High Flux Heat Exchanger," McDonnell Douglas Missile Systems Company, St. Louis, Missouri, Apr. 1991-May 1991, \$6,438.
15. "Immersion Cooled Standard Electronic Clamshell Module," Naval Air Warfare Center, Indianapolis, Indiana, Sep. 1991-Sep. 1992, \$99,453.
16. "General Electric Foundation Fellowship", General Electric Company, Aug. 1991-Aug. 1992, \$14,740.
17. "High Performance Evaporative Cooling for Thermal Management in Electronic Packaging," IBM Data Systems Division, Poughkeepsie, New York, Feb. 1992-Jan. 1993, \$60,000.
18. "Materials Processing Test Bed," Purdue University Research Center on Intelligent Manufacturing Systems, Sep. 1992-Aug. 1993, \$60,000.
19. "Narrow Channel and Evaporative Cooling for Thermal Management in Electronic Packages," IBM Data Systems Division, Poughkeepsie, New York, Feb. 1993-Dec. 1993, \$74,029.
20. Shipments of Fluorinert liquids and specialized filter, 3M Company, St. Paul, Minnesota, 1987-1993, \$150,000.
21. "Near-Wall Measurement of Sublayer Dryout and Theoretical Modelling of CHF in Vertical Channels," U.S. Department of Energy, Office of Basic Energy Sciences, Sep. 1993-Aug. 1996, \$359,556.
22. "Intelligent Materials Processing Test Bed: Development and Adaptation of Process Models," Purdue University Research Center of Intelligent Manufacturing Systems, Sep. 1993-Sep. 1995, \$50,000.
23. "Evaluation of the Feasibility of Liquid Encapsulated Module (LEM) in the Thermal Management of CMOS-based Computer Systems," IBM Shared University Research Program, Dec. 1993-Nov. 1994, \$50,000.
24. "Integrated Manufacturing Predoctoral Fellowship," U.S. Department of Energy, Sep. 1993-Aug. 1995, \$39,948.48.
25. "Modeling of Liquid Jet Atomization Process," Air Force Office of Scientific Research, Jul. 1994-Jun. 1996, \$18,000.
26. "Investigation of the Thermal Resistance of a Low-Cost Detachable Boiling Heat Sink for High Flux Applications," IBM Shared University Research Program, Dec. 1994-Nov. 1995, \$50,000.
27. "Subcooled Liquid Change of Phase Thermal Management for Electronic Packaging: New Cooling Concept for a Compact, Light-Weight, Multi-kilowatt Avionic Enclosure for Future Advanced Aircraft," Mudawar Thermal Systems, Inc., West Lafayette, Indiana, Mar. 1996-Mar. 1998, \$203,059.
28. Link Foundation Fellowship, Jul. 1996-Jun. 1997, \$18,000.
29. "Critical Heat Flux in Micro-Channel Flow," U.S. Department of Energy, Office of Basic Energy Sciences, Sep. 1997-Aug. 2000, \$498,905.
30. "Micro-Channel Heat Sink Design," Purdue Research Foundation, Jan. 1998- Mar. 2000, \$24,292.
31. Microfabrication facility, equipment donation, including Perkin Elmer 2400-8J Sputtering System, Tamarack 162 Projection Mask Aligner, Headway CB15 spinner, Tencor Alphastep 200 profilometer, and laboratory chemical fume hood, Raytheon Systems Company, Indianapolis, IN, 1998, \$1,000,000.
32. "Study of Pressurized Water Reactor DNB," Bettis Atomic Power Laboratory, Apr. 1999-Feb. 2001, \$260,922.
33. "High-Heat-Flux Micro-Channel Heat Sinks," U.S. Department of Energy, Office of Basic Energy Sciences, Sep. 2000-Aug. 2003, \$374,642.
34. "Investigation of Critical Heat Flux in Reduced Gravity using Photomicrographic Methods," NASA, Mar. 1, 2000-Nov. 30, 2003, \$280,000.
35. "21st Century Infrared Sensing for Safety and Quality in Biomedical, Food, Environmental and Manufacturing Applications," Indiana 21st Century Research and Technology Fund, 2000-Aug. 2002, \$1,106,765, submitted by

Purdue University, Indiana University, University of Notre Dame, En'Urga Inc., Hemocleanse Inc., Bioanalytical Inc., Purdue PIs: I. Mudawar, J. Gore; R. Singh, J. Sojka, L. Xu.

36. Russian propylene loop heat pipe (LHP) for spacecraft thermal management, equipment donation, Air Force Research Laboratory (AFRL), Kirtland Air Force Base, New Mexico, 2000, \$10,000.
37. Boiling test chamber, equipment donation, Motorola, Arlington Heights, IL, 2000, \$10,000.
38. "Boiling Heat Transfer," Zmola Memorial Fund, Jan. 2000, \$5,300.
39. "Large Surface Area High-Heat-Flux Two-Phase Cooling," Raytheon Company, Sep. 1, 2001-Aug. 31, 2002, \$42,000.
40. "Large Surface Area High-Heat-Flux Two-Phase Cooling," Raytheon Company, July 17-Dec. 31, 2002, \$42,000.
41. "Active Cooling of Solid State Amplifiers," Raytheon Company, Aug. 1, 2002-Jul. 31, 2003, \$60,000.
42. "University Technology Center in High Mach Propulsion," Rolls Royce and Allison Advanced Development Company, Jan. 2003 – Dec. 2003, \$200,000, with Profs. Stephen Heister, William Anderson and Paul Sojka.
43. "Flow Boiling CHF in Reduced Gravity," NASA, Jan. 1, 2004-Sep. 30, 2008, \$507,501.
44. "High-Heat-Flux Micro-Channel Heat Sinks," U.S. Department of Energy, Office of Basic Energy Sciences, Sep. 2003-Aug. 2004, \$80,000.
45. "Micro-Channel Flow Boiling Module," Raytheon Company, Sep. 1-Dec. 31, 2003, \$20,000.
46. "University Technology Center in High Mach Propulsion," Rolls Royce and Allison Advanced Development Company, Jan. 2004 – Dec. 2004, \$250,000, with Profs. Stephen Heister, William Anderson and Paul Sojka.
47. "Expansion of Propulsion and Power Center of Excellence," Indiana 21st Century Research and Technology Fund, Apr. 2004 – Mar. 2006, \$1,608,881, with Profs. Stephen Heister, William Anderson Charles Merkle and Paul Sojka, submitted by Allison Advanced Development Company, Purdue University, Indiana University – Purdue University Indianapolis, Indiana Space and LLC corp.
48. "Micro-Channel Refrigeration Cooling System," Office of Naval Research, Apr. 1, 2004 – Sep. 30, 2008, \$537,692.
49. "Diagnostics Facility for High-Flux Micro-Channel Refrigeration Cooling for Defense Electronics," Defense University Research Instrumentation Program (DURIP), Office of Naval Research, May 1, 2005 – Apr. 30, 2006, \$150,485.
50. "Flow Boiling in Reduced Gravity," NASA, Jan. 8, 2004 – Nov. 30, 2007, \$30,001.
51. "Enhanced Heat Transfer for Hydrogen Storage in Metal Hydrides," General Motors Corporation, Oct. 1, 2005 – Mar. 31, 2007, \$169,851, with Profs. Timothy Fisher and Jay Gore.
52. "University Technology Center in High Mach Propulsion," Allison Advanced Development Company, Jan. 2007 – Dec. 2007, \$300,000, with Profs. Stephen Heister, William Anderson and Paul Sojka.
53. "Optimization of Manufacturable High Pressure Metal Hydride Storage Systems," General Motors Corporation, Apr. 1, 2007 – January 31, 2009, \$764,043, with Drs. Timothee Pourpoint, Yuan Zhang and Profs. Timothy Fisher and William Anderson.
54. "Pool Boiling Tests with Enhanced 3M Surfaces," 3M Company, St. Paul, Minnesota, Jun. 1, 2007 – Jan. 31, 2008, \$28,800.
55. "Modeling Tools for Two-Phase Electronics Cooling Systems," Navy STTR subcontract, Jul. 1, 2007 – Apr. 30, 2008, \$29,996.
56. Support for Senior Design Course, General Motors Corporation, Jan. 1, 2007 – Apr. 30, 2008, \$8,000.
57. "Rolls-Royce-Purdue University Technology Center in High Mach Propulsion," Rolls Royce and LibertyWorks, Jan. 2008 – Dec. 2008, \$300,000, with Profs. Stephen Heister and Paul Sojka.
58. "Optimization of Manufacturable High Pressure Metal Hydride Storage Systems- Phase 1 Extension Proposal," General Motors Corporation, June 1, 2008 – June 30, 2009, \$347,422, with Drs. Timothee Pourpoint, Yuan Zhang and Profs. Timothy Fisher and William Anderson.

59. "Physics-Based Modeling and Measurement of High-Flux Condensation Heat Transfer," Office of Naval Research, Oct. 1, 2008 – Sep. 30, 2011, \$346,368.
60. "Two-Phase Flow Models," Mudawar Thermal Systems, STTR subcontract, Nov. 20, 2008 – Aug. 20, 2012, \$451,203.
61. "Rolls-Royce-Purdue University Technology Center in High Mach Propulsion," Rolls Royce and LibertyWorks, Jan. 2009 – Dec. 2009, \$300,000, with Profs. Stephen Heister and Paul Sojka.
62. "Effects of Reduced Gravity on Flow Boiling, Including Dryout, and Condensation," NASA, Mar. 2009 – Feb. 2012, \$338,134.
63. "Spray Cooling of Inner Walls of Gun Tubes," BAE Systems, Mar. 1 – Dec. 31, 2009, \$50,000.
64. "Rolls-Royce-Purdue University Technology Center in High Mach Propulsion," Rolls Royce and LibertyWorks, Jan. 2010 – Dec. 2010, \$300,000, with Profs. Stephen Heister and Paul Sojka.
65. "Effects of Reduced Gravity on Flow Boiling, Including Dryout, and Condensation – Funding Addendum," NASA, Jun. 2011 – May 2012, \$61,250.
66. "Rolls-Royce-Purdue University Technology Center in High Mach Propulsion," Rolls Royce and LibertyWorks, Jan. 2011 – Dec. 2011, \$310,000, with Profs. Stephen Heister and Paul Sojka.
67. "Flow Boiling and Condensation Experiment," NASA, Jun. 2012 – May 2017, \$950,000.
68. "Effects of Reduced Gravity on Flow Boiling and Condensation," NASA, Jun. 2012 – May 2014, grant to support three microgravity parabolic flight experiments.
69. "Adaptable Single Active Loop Thermal Control System (TCS) for Future Space Missions," NASA, Jan. 1, 2013 – Dec. 31, 2015, \$500,000.
70. "Performance of Flow Boiling Hardware and Instrumentation in Reduced Gravity," NASA, Jun. 2013 – May 2015, grant to support microgravity parabolic flight experiments.
71. "Flow Boiling and Condensation in Microgravity," NASA Graduate Student Fellowship, Aug. 1, 2015 – Jul. 31, 2019, \$297,000.
72. "Flow Boiling and Condensation Experiment," NASA, Jun. 2017 – Dec. 2021, \$795,000.
73. "Novel Ultra-Fast Charging System Thermal Management For Electric Vehicles," Ford Motor Company, Mar. 1, 2018 – Feb. 29, 2020, \$209,998.
74. "Direct Liquid Impingement Cooling of Power Electronics Substrates," Center of Excellence for Integrated Thermal Management of Aerospace Vehicles (CITMAV), Aug. 1, 2018 – Jul. 31, 2020, \$170,000.
75. "Universal Two-Phase Flow Pressure Drop and Heat Transfer Correlations for Cryogenic Fluids," NASA, Oct. 8, 2018 – Oct. 1, 2021, \$328,176.90.
76. "Experimental and Theoretical Investigation into Prediction and Prevention of Two-phase Flow Instabilities in High-flux Micro-channel Heat Sinks," Center of Excellence for Integrated Thermal Management of Aerospace Vehicles (CITMAV), Jan. 1, 2019 – Dec. 31, 2020, \$140,000.