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Papers in Refereed Journals

- [1] *S. J. Kim, T. McKrell, J. Buongiorno, L. W. Hu, "Enhancement of flow boiling Critical Heat Flux (CHF) in alumina/water nanofluids", *Advanced Science Letters* (in press).
- [2] *S. J. Kim, T. McKrell, J. Buongiorno, L. W. Hu, "Experimental Study of Flow Critical Heat Flux in Alumina-Water, Zinc-oxide-Water and Diamond-Water Nanofluids", *J. Heat Transfer* (in press).
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- [5] *W. C. Williams, J. Buongiorno, L. W. Hu, "Experimental Investigation of Turbulent Convective Heat Transfer and Pressure Loss of Alumina/Water and Zirconia/Water Nanoparticle Colloids (Nanofluids) in Horizontal Tubes", *J. Heat Transfer*, Vol. 130, 042412, Apr 2008.
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- [7] J. Buongiorno, L. W. Hu, S. J. Kim, R. Hannink, B. Truong, E. Forrest, “Nanofluids for Enhanced Economics and Safety of Nuclear Reactors: an Evaluation of the Potential Features, Issues and Research Gaps”, *Nuclear Technology*, Vol. 162, 80-91, 2008.
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- [10] *J. Eapen, W. C. Williams, J. Buongiorno, L. W. Hu, S. Yip, R. Rusconi, R. Piazza, “Mean-Field Versus Micro-Convection Effects in Nanofluid Thermal Conduction”, *Physics Review Letters*, 99, 095901, 2007. (Selected for the September 10, 2007 issue of Virtual Journal of Nanoscale Science & Technology)
- [11] *S. J. Kim, I. C. Bang, J. Buongiorno, L. W. Hu, “Surface Wettability Change during Pool Boiling of Nanofluids and its effect on Critical Heat Flux”, *Int. J. Heat Mass Transfer*, Vol. 50, 4105-4116, 2007.
- [12] *C. Gerardi, J. Buongiorno, “Pressure-Tube and Calandria-Tube Deformation following a Single Channel Blockage Event in ACR-700”, *Nuclear Engineering and Design*, Vol. 237/9, 943-954, 2007.
- [13] *S. J. Kim, I. C. Bang, J. Buongiorno, L. W. Hu, “Study of Pool Boiling and Critical Heat Flux Enhancement in Nanofluids”, *Bulletin of the Polish Academy of Science*, Vol. 55, No. 2, 211-216, 2007. (Invited paper)
- [14] *S. J. Kim, I. C. Bang, J. Buongiorno, L. W. Hu, “Effects of nanoparticle deposition on surface wettability influencing boiling heat transfer in nanofluids”, *Applied Physics Letters*, Vol. 89, 153107, Issue 15, 2006. (Selected for the October 23, 2006 issue of the Virtual Journal of Nanoscale Science & Technology)
- [15] J. Buongiorno, “Convective Transport in Nanofluids”, Vol. 128, 240-250, *J. Heat Transfer*, 2006.
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Proceedings of Peer-reviewed Conferences

Full Papers

- [1] *S. J. Kim, T. McKrell, J. Buongiorno, L. W. Hu, “Subcooled Flow Boiling Heat Transfer of Dilute Alumina, Zinc Oxide, and Diamond Nanofluids at Atmospheric Pressure”, Paper 032, *NUTHOS-7: The 7th International Topical Meeting on Nuclear Reactor Thermal Hydraulics, Operation and Safety*, Seoul, Korea, October 5-9, 2008. (submitted)
- [2] *H. Kim, J. Buongiorno, L. W. Hu, T. McKrell, G. Dewitt, “Experimental study on quenching of a small metal sphere in nanofluids”, *Proceedings of the ASME International Mechanical Engineering Congress and Exposition (IMECE2008)*, October 31 – November 6, Boston, USA, 2008.
- [3] *C. Gerardi, J. Buongiorno, L. W. Hu, T. McKrell, “Experimental observation of the dynamic micro- and macro-layer during pool boiling”, Paper 56010, *Proceedings of the 2008 ASME Heat Transfer, Fluids, Energy & Energy Nano Conferences (HTFESN2008)*, Jacksonville, Florida, August 10-14, 2008.
- [4] *B. Truong, L. W. Hu, J. Buongiorno, “Surface Modifications Using Nanofluids for Nucleate Boiling Heat Transfer and CHF Enhancements”, Paper 62085, *Proceedings of 6th International Conference on Nanochannels, Microchannels and Minichannels (ASME-ICNMM2008)*, Darmstadt, Germany, June 23-25, 2008.
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- [12] J. Buongiorno, L. W. Hu, I. C. Bang, "Towards an Explanation of the Mechanism of Boiling Critical Heat Flux Enhancement in Nanofluids" (invited keynote paper), Paper 30156, *Proceedings of 5th International Conference on Nanochannels, Microchannels and Minichannels (ASME-ICNMM2007)*, Puebla, Mexico, June 18-20, 2007.
- [13] *R. Hannink, J. Buongiorno, L.W. Hu, G. Apostolakis, "Enhancement of the In-Vessel Retention Capabilities of Advanced Light Water Reactors through the Use of Nanofluids", Paper 7106, *Proceedings of ICAPP 2007*, Nice, France, May 13-18, 2007.
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Paper Summaries

- [1] *H. Kim, J. Buongiorno, L. W. Hu, T. McKrell, G. Dewitt, “Experimental Investigation of Quenching of a Small Sphere in Dilute Nanofluids”, *Proc. 2008 ANS Winter Meeting*, November 9-13, Reno, Nevada, 2008.
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Books

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Other Publications

- [1] *B. Truong, L. W. Hu, J. Buongiorno, *Program on Technology Innovation: Applications of Nanofluids to Enhance Heat Transfer in Nuclear Reactors – Interim Report*. Electric Power Research Institute (EPRI), Palo Alto, CA: 2008. 1016913.
- [2] *M. S. Kazimi, J. Buongiorno, T. Conboy, T. Ellis, P. Ferroni, P. Hejzlar, S-P. Kao, A. Karahan, T. McKrell, E. Pilat, and N. E. Todreas, *Core Design Options for High Power Density BWRs*, MIT-NFC-PR-097, November 2007.
- [3] *R. Hannink, J. Buongiorno, Lin-wen Hu, and G. Apostolakis, *Using Nanofluids to Enhance the Capability of In-Vessel Retention of Fuel Following Severe Reactor Accidents*, MIT-ANP-TR-116, June 2007.
- [4] *M. S. Kazimi, J. Buongiorno, T. Conboy, T. Ellis, P. Ferroni, P. Hejzlar, S-P. Kao, A. Karahan, K. Kobayashi, E. Pilat, and N. E. Todreas, *Core Design Options for High Power Density BWRs*, MIT-NFC-PR-089, December 2006.
- [5] *S. J. Kim, I. C. Bang, J. Buongiorno, L. W. Hu, “On the Enhancement of the Critical Heat Flux in Water-Based Nanofluids for Applications in Nuclear Systems”, *Proceedings of the*

- Workshop on Modeling and Measurements of Two-Phase Flows and Heat Transfer in Nuclear Fuel Assemblies*, Royal Institute of Technology, Stockholm, October 10-11, 2006.
- [6] B. D. Middleton, J. Buongiorno, *Supercritical Water Reactor Cycle for Medium Power Applications*, Nuclear Science Engineering Department, MIT, MIT-ANP-TR-110, June 2006.
- [7] *C. Gerardi, J. Buongiorno, *Investigation of Pressure-Tube and Calandria-tube Deformation following a Single-Channel Blockage Event in ACR-700*, Nuclear Science Engineering Department, MIT, MIT-ANP-TR-109, November 2005.
- [8] J. Buongiorno, W. Corwin, P. MacDonald, L. Mansur, R. Nanstad, R. Swindeman, A. Rowcliffe, G. Was, D. Wilson, I. Wright, *Supercritical Water Reactor (SCWR), Survey of Materials Experience and R&D Needs to Assess Viability*, INEEL/EXT-03-00693 (Rev. 1), Idaho National Engineering and Environmental Laboratory, September 2003.
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- [10] J., Buongiorno, K. G. Condie, G. E. McCreery, D. M. McEligot, M. E. Nitzel, J. E. O'Brien, *The INEEL Heat Transfer Flow Loop for Development of Supercritical-Water-Cooled Reactors*, INEEL/PRO-03-00565 (Rev. 1), Idaho National Engineering and Environmental Laboratory, June 2003.
- [11] D. Petti, J. Maki, J. Buongiorno, R. Hobbins, G. Miller, *Key Differences in the Fabrication, Irradiation and Safety Testing of U.S. and German TRISO-coated Particle Fuel and Their Implications on Fuel Performance*. Report INEEL/EXT-02-00300, INEEL, June 2002.
- [12] J. Buongiorno, N. E. Todreas, M. S. Kazimi, *Conceptual Design of a Lead-Bismuth Cooled Fast Reactor with In-Vessel Direct-Contact Steam Generation*, MIT, Nuclear Engineering Department. Technical Report MIT-ANP-TR-079. March 2001.
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- [14] J. Buongiorno, P. Hejzlar, N. Todreas, M. Driscoll, M. Kazimi. *Actinide Transmutation by Lead-Bismuth Cooled Reactors*. Report MIT-ANP-TR-065. Department of Nuclear Engineering, MIT. June 1999.
- [15] J. Buongiorno and D. Giuffrida, *A Feasibility Study on the Decommissioning of the Research Nuclear Reactor L-54M of the Polytechnic of Milan*, B.S. Thesis Dissertation, Nuclear Engineering Department, Polytechnic of Milan, 1995. (in Italian)

Invited Lectures

- “The Nuclear Renaissance in the U.S.”, Fermilab, Batavia, Illinois, July 30, 2008.
- “Heat Transfer Enhancement in Nanofluids”, Caltech, Pasadena, California, April 22, 2008.
- “Nanofluids and Nuclear Power”, University of California at Berkeley, April 21, 2008.
- “Heat Transfer Enhancement in Nanofluids and Their Applications to Nuclear Power”, Rensselaer Polytechnic Institute (RPI), Troy (NY), April 16, 2008.
- “Heat Transfer Enhancement in Nanofluids: The MIT Research Program”, University of Leeds, United Kingdom, March 28, 2008.
- “Nanofluids for Enhanced Economics and Safety of Nuclear Reactors”, University of Wisconsin at Madison, March 25, 2008.

- “New Safer Nuclear Reactors”, Rencontres de Physique de la Vallée d'Aoste, La Thuile, Italy, February 27, 2008.
- “Enhancement of Transport Phenomena in Nanofluids”, King Abdulaziz City of Science and Technology (KACST), Riyadh, Kingdom of Saudi Arabia, January 22, 2008.
- “Nanofluids for Enhanced Economics and Safety of Nuclear Reactors”, GCEP-MIT Workshop on Nuclear Fission, Opportunities for Fundamental Research and Breakthrough in Fission University Park Hotel at MIT, Cambridge, Massachusetts, November 29, 2007.
- “Nucleate Boiling and CHF Characteristics of Nanofluids”, Engineering Conferences International (ECI) - Nanofluids: Fundamentals and Applications, Copper Mountain, Colorado, September 18, 2007.
- “Towards an Explanation of the Mechanism of Boiling Critical Heat Flux Enhancement in Nanofluids”, Keynote lecture at 5th International Conference on Nanochannels, Microchannels and Minichannels (ASME-ICNMM2007), June 18-20, 2007, Puebla, Mexico.
- “Nuclear Power Prospects in the U.S. – The MIT View”, Polytechnic of Milan, May 23, 2007. (in Italian)
- “Use of Nanofluids for Enhanced Economics and Safety of Nuclear Reactors”, Paul Scherrer Institut (PSI), Zurich, May 21, 2007.
- “The Potential of Nanofluids as Next-Generation Coolants”, Cairo 10th International Conference on Energy and Environment, Luxor, Egypt, March 11-15, 2007.
- “An Innovative Assembly Concept for High Power Density BWRs”, Toshiba, Power and Industrial Systems Research and Development Center, Yokohama, November 29, 2006.
- “Use of Nanofluids for Enhanced Economics and Safety of Nuclear Reactors”, 2nd International Symposium on Innovative Nuclear Energy Systems (INES-2), organized by the Tokyo Institute of Technology, Yokohama, Japan, November 26-30, 2006.
- “Research on Innovative Nuclear Power Technology at MIT”, Royal Institute of Technology, Stockholm, October 9, 2006.
- “The Nuclear Renaissance in the U.S.”, in the roundtable on nuclear power (“Un nuovo nucleare: un’ipotesi concreta?”) at the 2006 Festa Nazionale della Margherita, Caorle, September 10, 2006. (in Italian)
- “Boiling Critical Heat Flux Enhancement in Nanofluids for Nuclear Applications”, Idaho National Laboratory, Idaho Falls, Idaho, July 10, 2006.
- “Heat transfer enhancement in nanofluids”, Energy Nanotechnology International Conference (ENIC '06), Cambridge, June 26, 2006.
- “Near-Term Advanced Nuclear Reactors and Related MIT Research”, Energy Short Course, MIT, June 16, 2006.
- “The SuperCritical Water Reactor (SCWR): Introduction and Core Design Review”, KAPL SCWR Review Meeting, Albany, March 7, 2006.
- “Nanofluid Coolants for Advanced Nuclear Power Plants”, Idaho National Laboratory, Idaho Falls, Idaho, June 28, 2005.
- “Nanofluid Coolants for Nuclear Applications”, Texas A&M, College Station, Texas, December 8, 2004.
- “The Supercritical Light-Water-Cooled Reactor and its Potential for Improved Economics”. Seminars held at:
 - American Nuclear Society 2002 Winter Meeting, November 18,
 - 2002 General Electric (GE) Nuclear, San Jose, December 5, 2002
 - Department of Nuclear Engineering of MIT, Cambridge, December 12, 2002
 - Department of Engineering Physics of the University of Wisconsin at Madison, January 9, 2002
 - Idaho Office of the U.S. Department of Energy (DoE), Idaho Falls, January 22, 2002
 - Idaho State University, January 31, 2003
 - Westinghouse Electric Company, Pittsburgh, February 7, 2003

- Argonne National Laboratory - West, Idaho Falls, March 11, 2003
- Department of Nuclear Engineering of Texas A&M, College Station, April 14, 2003
- Department of Nuclear Engineering of the University of California at Berkeley, November 24, 2003
- “The Supercritical Water Cooled Reactor (SCWR) and its Safety Characteristics”, U.S. Nuclear Regulatory Commission, Rockville, October 8, 2003.
- “Thermal-Hydraulic and Safety Needs for the SCWR System”, Generation-IV Workshop on the Thermal-hydraulics of Generation-IV reactors, Idaho Falls, March 18-19, 2003.
- “The Development of the Supercritical Light-Water-Cooled Reactor (SCWR) in the U.S.”, Seminars held at:
 - Ministry of Energy Technology of Japan (METI), Tokyo, July 16, 2003
 - Conference of Japan Nuclear Utilities and Vendors, Tokyo, July 17, 2003
 - Inland Northwest Research Alliance (INRA), Idaho Falls, October 27, 2003
 - Atomic Energy of Canada Limited (AECL), Chalk River, November 13, 2003
- “Innovative Core Designs for the Supercritical Water Cooled Reactor”, Department of Nuclear Engineering of MIT, Cambridge, May 16, 2003.
- “Evaluation of Polonium Extraction Technology for Lead-Bismuth Cooled Fast Reactors”. *Russia-Japan LBE Workshop*, Tokyo Institute of Technology, Tokyo, February 2001.
- “Conceptual Design of a Lead-Bismuth Cooled Fast Reactor with In-Vessel Direct-Contact Steam Generation”, Department of Engineering Physics of the University of Wisconsin at Madison. February 2001.
- “Lead-Bismuth-Cooled Reactors for Actinide Burning and Power Production”, Department of Engineering Physics of the University of Wisconsin at Madison. May 2000.