Ranga Kumar

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https://sites.google.com/site/profranganathankumar

Associate Dean for Research and Administration

College of Engineering and Computer Science

Pegasus Professor, UCF

Rm 307, Engr I

4000, Central Florida Blvd

Orlando, FL 32816

Work : **(**407) 823-4389 ; cell : (407) 489-8293

email: Ranganathan.Kumar@ucf.edu

Education

Ph.D., Univ. of Illinois at Urbana-Champaign, Theoretical and Applied Mechanics, 1983
M.S., Georgia Institute of Technology, Aerospace Engineering, 1978
B.Tech., Madras Institute of Technology, Aeronautical Engineering, 1976
B.Sc., University of Madras, Mathematics, 1973

Professional Interests

Academic research administration; Research in droplet and spray drying and combustion in acoustic field; Bio-energy; Microfluidics/Nanofluids; Laser-based measurements; Computational Fluid Dynamics; STEM education and outreach.

Work Experience

- **University of Central Florida**
  - Associate Dean for Research and Administration, College of Engineering and Computer Science, *December 2012 - present*
  - Professor, Department of Mechanical and Aerospace Engineering, *August 2003-present*
  - Department Chair, Mechanical, Materials and Aerospace Engineering, *Jan 2003 – August 2008*
- **Knolls Atomic Power Lab, Lockheed Martin**, Schenectady, NY
  - Advisory Engineer, *July 2001 – Jan 2003*
  - Senior Engineer, *July 1993 – July 2001*
- **Clemson University, Department of Mechanical Engineering**
  - Associate Professor *Aug. 1991 - July 1993* (tenured in 1991)
  - Assistant Professor *Aug. 1985 - Aug. 1991*
  - Research Associate/Visiting Assistant Professor *Jan. 1983 - Aug. 1985*

Professional Societies, Activities and Awards

- Pegasus Professorship, University of Central Florida, 2011 - *awarded for significant impact on teaching, research and service.*
- Research Incentive Award, 2011-2012.
- Associate Editor, ASME Journal of Thermal Sciences and Engineering Applications (2012-2015).
- ASME Fellow; Member since 1984.
- Excellence in Research Award, Department of Mechanical, Materials and Aerospace Engineering, 2009.
- Leadership Award, Outstanding Achievement in Two-Phase Flow Experimental and Model Development, Lockheed, 1998.
- Byars Prize for Teaching Excellence in Engineering Mechanics, College of Engineering, Clemson University, 1986.
- The following technical papers received distinction:
  - A. Sanyal, S. Basu and R. Kumar, "Dominant Oscillation Modes in a Radiatively Heated Acoustically Levitated Droplet," 11th International ISHMT/ASME Heat and Mass Transfer Conference, HMTC 1300257, Dec 28-31, Kharagpur, India, 2013. **[*Received Best Paper award and certificate*]**
  - P. Sachdeva and R. Kumar, "Effect of Hydration Layer and Surface Wettability in Enhancing Thermal Conductivity of Nanofluids," *Applied Physics Letters*, 95, 223105, 2009 (Featured in ***Virtual J Biological Physics***, Dec 15, 2009.
  - R. Kumar and D. Milanova, "Effect of Surface Tension on Nanotube Nanofluids," *Applied Physics Letters*, 94, p. 073107, 2009 (Featured in ***Virtual J Nanoscale Science and Technology***, Mar 2, 2009.
  - D. Milanova and R. Kumar, "Heat Transfer Behavior of Silica Nanoparticles in Pool Boiling Experiment," *J. Heat Transfer*, 130, 042401-2, 2008 (**Top 10 Most Downloaded Articles** -- April 2008).
- ASME Mechanical Engineering Department Heads, Member, 2003 – 2008.
- Chairman, ASME K-19 Committee, Heat Transfer in Environmental Systems (1997-1999); Vice-Chair (1995-1997); Member since 1985.
- Member, ASME Long Range Planning and Development Committee, 2000 - 2001.
- ASME Committee on Member Interests, Basic Engineering Group (1995 - 1998)
- ASME Committee on Member Interests, Technical Correspondent (1995 – 1996)
- Reviewer, Research Proposals: NSF; DoE; Research Competitiveness Program, State of Louisiana
- Review Panel: NSF, DoE

❖ Reviewer, Journal articles:

Applied Physics Letters
Physics Letters A
Journal of Heat Transfer
Int. Journal of Heat and Mass Transfer
Int. Journal of Multiphase Flow
Int. Journal of Heat and Fluid Flow
Int. Journal of Numerical Methods in Fluids
Int. Journal of Thermal Sciences
Int. Journal of Thermophysics and Heat Transfer
Microfluidics Nanofluidics
Computers and Fluids
Nanoscale Research Letters
IEEE Trans. Nanotechnology
Journal of Nanoparticle Research
AIAA Journal
Numerical Heat Transfer
Journal of Chemical Eng. Communications
Journal of Engineering Analysis
Journal of Mechanical Engineering Science
Journal of Engineering Mechanics
European Physical Journal D
Thermochimica Acta

❖ Reviewer, Conferences:

ASME Heat Transfer Division
ASME Fluids Engineering Division
ICLASS – International Conference on Liquid Atomization and Spray Systems
Intl. Conf. Nano, Micro and Mini Channels as Track Chair and Session Chair for several years.

Advisee Awards

- James Wilson, 2nd Place, Outstanding Honors in Major Thesis award, University of Central Florida, 2014.
- Abhishek Saha, Best Dissertation award, University of Central Florida, 2013.
- Apratim Sanyal, Best Presentation award, 11th International ISHMT/ASME Heat and Mass Transfer Conference, Dec 28-31, Kharagpur, India, 2013.
- Ehsan Yakshi-Tafti, Best Dissertation award, College of Engineering and Computer Science, 2010.
- Amit Gupta, Best Dissertation award, College of Engineering and Computer Science, 2009.
- Denitsa Milanova, UCF Undergraduate Research Showcase Competition: First place, “Pool Boiling Heat Transfer in Carbon Nanotubes” 2007.

- Denitsa Milanova, UCF Undergraduate Research Showcase Competition: First place, "Chemical Aspects of Nanofluid Heat Transfer" 2005.

Research Projects

External Funding at UCF (January 2003 – now)

- Science Understanding, Math Mentoring Integrated with Technology, **State of Florida**, PI, July 2013 – May 2014.
- Science Understanding, Math Mentoring Integrated with Technology, **State of Florida**, co-PI; (PI: Larry Chew); July 2012 – June 2014.
- Modeling Multiphase Flow in Bitumen Pay Zone, **Harris Corp** (with match from **Florida High Tech Corridor Council)**, PI, May 2013 – Jan 2014.
- Droplet Thermotaxis: A New Platform Technology for Droplet-based Microfluidic Systems, **National Science Foundation, co**-PI; (PI: Dr. Hyoung Cho).
- Algal Biofuel for Aviation, **AFoSR**, co-PI; (PI: J. Kapat), Nov 2010-Oct 2011.
- Thermal Modeling and Measurements in Pressurized Boiling, **Knolls Atomic Power Lab**, PI, Sept 2006 – December 2011.
- Small Equipment: Infrared Thermography System for Temperature Measurements in Microchannel/Minichannel and Droplet, **National Science Foundation,** PI; June 2009 – May 2010.
- FCAAP – Analysis of Combustion Stability, Emission Characteristics, Fuel Atomization and Vaporization Dynamics of Conventional and Alternative Fuels, **Florida Center for Advanced Aero-Propulsion**, co-PI; (PI: J. Kapat), Oct 2008 – Aug 2010.
- FCAAP – In-Situ Laser Based Measurements of Vaporization Dynamics of Biofuel Droplets, **Florida Center for Advanced Aero-Propulsion**, PI; Jan 2010 – Dec 2010.
- Experiment on Carbon dioxide Removal in Space Habitats, **Florida Space Grant Consortium**, PI; Aug 2008 – Dec 2009.
- Innovative Passive Two-Phase Thermal Management Systems for Aircraft and Spacecraft Environments, **NASA-SFTI**, PI; Dec 2006 – May 2008.
- Carbon dioxide Removal in Space Habitats, **Florida Space Institute**, PI, July 2007 – May 2008.
- REU Site: Extension of Knowledge to Small Scale Engineering – Integration, Interface and Interpretation (INT^3), **National Science Foundation**, PI; (Co-PI: H. Cho), May 2007 – April 2010.
- Research on the use of Hydrogen Sulfide Scavengers in Multiphase Flow, **Petrobras**, PI, December 2005 – May 2008.
- Research on the use of Hydrogen Sulfide Scavengers in Multiphase Flow, Phase II, **Petrobras**, PI, June 2008 – December 2009.

- Industry/University Cooperative Research Center, Site at UCF in Multiphase Transport Phenomena, **National Science Foundation**, PI.
- Testing Diverters in Multiphase Flow, **ACS Systems Engineering**, PI; January 2007 – December 2007.
- Nanofluid Characteristics in Pool Boiling, PI, **National Science Foundation**, Nanotechnology Exploratory Research, PI, (Co-PIs: S. Seal, J. Kapat); July 2004 – Dec 2006.
- Central Florida Space Science Institute, RET, PI, **National Science Foundation**, PI, (Co-PI: E Petersen); May 2004 – May 2008.
- Thin Film Energetic Materials, **Lockheed Martin**, co-PI, (PI: K. Coffey); April 2006 – March 2007.
- Multiphase Pump Research, PI, **Seepex**, April 2005 – July 2005.
- Thin Film Energetic Materials, **Lockheed Martin**, PI, (co-PI: K. Coffey); April 2005 – Dec 2005.
- Thermochromic Liquid Crystal Measurements in Pressurized Boiling Experiments, **Knolls Atomic Power Laboratory (Lockheed Martin)**, PI, (co-PI: J. Kapat).
- A Thermal Model to Predict the Temperature Gradient Above an Exothermic Thin Film Thermite Reaction, **Lockheed Martin Missiles and Fire Control**, PI, Sept 2004 – Dec 2004.

Internal Funding (UCF):

- Autoclave System for Composite Materials Processing, Presidential Equipment Initiative match (PI: J. Gou), **Office of Research**, co-PI, UCF, 2008.
- Micro Particle Imaging Velocimetry measurements in micron-sized channels, Presidential Equipment Initiative match, **Office of Research**, PI, UCF, 2004.
- A New Generation of High Heat Transfer Nano Coolants, PI, **Office of Research**, PI, UCF, 2003.

Clemson (1985-1993)

- Study of Buoyancy Exchange Flow in Horizontal Partitions, Savannah River Site/DoE, PI, June 1993 - December 1995.
- Radioactive Waste Transport Inside Buildings Driven by Natural Convection Gas Flows, Savannah River Site/DoE, PI, May 1991 - May 1993.
- Fluid Dynamics of Phase Separation in a Field of Centrifugal Acceleration, NASA Kennedy Space Center, PI, May 1989 - October 1990.
- Experimental and Numerical Study of the Natural Convection of Gases Between Isothermal Concentric Cylinders, NSF, co-PI, January 1985 - May 1987.
- Passive Cooling in Nuclear Reactors, S.C. Energy Research and Development Center, PI, January 1987 - June 1987.

- Digital Image Processing and Reconstruction, ($12K), S.C. Energy Research and Development Center, P.I., 1991-92.
- Graduate Research Assistantship support: Laboratory Simulation of the Atmosphere, University Research Grant Committee, Clemson, P.I., 1987.
- Heat Dissipation in Transmission Cables, Office of University Research, Clemson, PI, 1985-1986.

Courses taught at Clemson and UCF:

- Undergraduate Courses

  Mechanical Measurements I, Fluid Mechanics, Aerodynamics II, Heat Transfer, Thermodynamics I and II, Numerical Methods in Engineering, Undergraduate design.

- Graduate Courses

  Foundation in Fluid Mechanics, Viscous Fluid Flow, Computational methods in fluid mechanics and heat transfer, Aerospace Engineering Measurements, Convective Heat Transfer, Multiphase flows, Turbulence and Optical Methods.

- Workshop conducted

  Two-Phase Flow Principles and Application

Ph.D. Students Advised

UCF:

1. Parveen Sachdeva; graduated, Fall 2009.
2. Amit Gupta; graduated Spring 2009.
3. Ehsan Tafti; graduated Fall 2010.
4. Navid Amini; graduated Fall 2010.
5. Xin Gu; graduated, Spring 2012.
6. Abhishek Saha; graduated, Summer 2012.
7. Joshua Lee; graduated, Fall 2013.
8. Jonathan Wehking; graduated, Fall 2013.
9. Ashkan Davanlou, passed Candidacy exam, to graduate in 2004.
10. Kalpana Hanthanan Arachchilage, new student.
11. Eduardo Castillo, new student.
12. P. Deepu, to graduate in Spring 2014, co-advisee in Indian Inst of Sci.
13. Ankur Miglani, to graduate in Spring 2015, co-advisee in Indian Inst of Sci.
14. Apratim Sanyal, to graduate in Spring 2015, co-advisee in Indian Inst of Sci.

Clemson:

15. Tim Conover, graduated in 1996; advisor, committee chair till 1993.
16. Dengfu Zhang, graduated in 1996; advisor, committee chair till 1993.

M.S. Students Advised (all theses)

UCF:

1. Manoj Venkataraman, graduated in 2005
2. Daniel Joo, graduated in 2006
3. Parveen Sachdeva, graduated in 2006
4. Kiran Talari, graduated in 2007
5. Amit Gupta, graduated in 2007
6. Navid Amini, graduated in 2007
7. Luis Zea, graduated in 2008
8. Xin Gu, graduated in 2009
9. Ehsan Yakhshi-Tafti, graduated in 2009
10. Diane Vazquez, graduated in 2010
11. Abhishek Saha, graduated August 2010
12. Joshua Lee, graduated August 2010
13. Benjamin Patrick, graduated Summer 2011.
14. Keon Vereen, graduated Fall 2011.
15. Erick Tijerino, graduated, Spring 2012.
16. Pretam Choudhury, expected graduation, Spring 2014.
17. Michael Gabany, expected graduation, Fall 2014.
18. James Wilson, expected graduation, Fall 2014.
19. Cody Urich, expected graduation, Fall 2014.

Clemson:

20. David Mahony, graduated in 1984
21. Ujjwal Chakraborty, graduated in 1987
22. M.A. Kalam, graduated in 1987
23. Sriram Ramanathan, graduated in 1988
24. Kerry Jameson, graduated in 1989
25. Sridharan Kannan, graduated in 1991
26. Timothy Conover, graduated in 1992
27. Yong Pan, graduated in 1992
28. Conrad Vincent, graduated in 1992
29. Satchi Venkataraman, graduated in 1993
30. Manish Singhal, graduated in 1993
31. Maneesh Narain, graduated in 1993

Undergraduate Research Students Advised at UCF

1. James Wilson, 2011-12
2. Michael Gabany, 2011-12
3. Denitsa Milanova, 2004-2008, Honors' thesis
4. Keon Vereen, 2008-2009 (NSF-REU, URE)
5. Ryan Clapp, 2008-2010 (NSF-REU, URE)
6. Brandon Dubas, 2009 (NSF-REU)
7. Stefan Szlendak, 2009 (NSF-REU)
8. Kyle Seleski, 2009 (NSF-REU)
9. Diana Gaviria, 2008 (NSF-REU)
10. Kevin Law, 2008 (NSF-REU)
11. Orlando Ardilla, 2007 (NSF-REU)
12. Jesse Kelly, 2007 (NSF-REU)

Post-Doctoral Fellows:

1. Dr. Jonathan Wehking (Dec 2013 – present)
2. Dr. Sohel Murshed (2008-2010)
3. Dr. Xuan Wu (2004-2007)
4. Dr. Steven Pothier (2006-2007)
5. Dr. Sanjeev Bharani (2005-2006)

LIST OF PUBLICATIONS

Total: 203 (94 journal papers and 109 conference proceedings)
Citations ~ 1500; H-index: 18

Book Chapter:

R. Kumar, "Two-Phase flow microstructures in thin geometries: Multi-field modeling," Ch. 5 in **Heat Transfer and Fluid Flow in Microstructures and Nanostructures**, Eds. Faghri and Sunden, WIT Press, pp. 173-224, 2004.

Patent:

Microfluidic Mixer Having Channel Width Variation for Enhanced Fluid Mixing, US Patent #8,430,558, issued April 30, 2013.

JOURNAL PUBLICATIONS

2014 (Papers accepted, in Review or near submission)

(My students marked by *)

1. A. Sanyal*, S. Basu and R. Kumar, "Experimental Analysis of Shape Deformation of Evaporating Droplet Using Legendre Polynomials," ***Physics Letters A,* 378**, pp. 539-548, 2014.
2. A. Miglani*, S. Basu and R. Kumar, "Insight into Instabilities in burning droplets for engineering new generation fuel droplets," ***Physics of Fluids***, **26**, 032101, 2014.
3. P. Deepu*, S. Basu and R. Kumar, "Multimodal Shape Oscillations of Pendant Droplets in an Air Stream," in review, ***Int. J. Multiphase Flow.***
4. H. Matharoo, D. Makkar, A. Gupta*, S. Hari, M. Ramadoss, R. Kumar, "Effect of Geometry on Droplet Formation in a Microfluidic Flow-Focusing Device," in review, ***Computers and Fluids***.
5. A. Davanlou* and R. Kumar, "Thermocapillary Effect on Spherical Droplets Levitated on a Thin Liquid Film," in preparation, ***Physics of Fluids.***
6. J. Lee*, A. Davanlou*, S. Basu and R. Kumar, "Property effects on atomization characteristics in hollow cone spray," in preparation, ***Fuel***.
7. J.D. Wehking* and R. Kumar, "Droplet actuation and binning in branched T-junction microchannel, in preparation, ***J. Fluid Mechanics.***
8. A. Miglani*, S. Basu and R. Kumar, "Suppression of instabilities in burning droplets using preferential acoustic perturbations," to be sent to ***Combustion and Flame***.

2013

9. S. Basu, E. Tijerino* and R. Kumar, "Insight into morphology changes of nanoparticle laden droplets in acoustic field," ***Appl. Phys. Lett***, **102**, 141602, 2013.
10. B. Pathak*, S. Basu and R. Kumar, "Heat and Mass Transfer and Chemical Transformation in a cerium nitrate droplet, ***Int. J Heat Mass Transfer***, **63**, pp. 301-312, 2013.
11. B. Pathak*, P. Deepu*, S. Basu and R. Kumar, "Modeling of agglomeration inside a droplet with nanosuspensions in an acoustic field," ***Int. J Heat Mass Transfer***, **59**, pp. 161-166, 2013.
12. P. Deepu*, S. Basu and R. Kumar, "Vaporization Dynamics of Functional Droplets in a Hot Laminar Air Jet," ***Int. J Heat Mass Transfer***, **33**, Issues 1-22, pp. 69-79, 2013.
13. S. Basu, A. Saha* and R. Kumar, "Criteria for Thermally Induced Atomization and Catastrophic Breakup of Acoustically Levitated Droplet," ***Int. J Heat Mass Transfer***, **59**, pp. 316–327, 2013.
14. A. Miglani*, D. Joo*, S. Basu and R. Kumar, "Nucleation Dynamics and Pool Boiling Characteristics of High Pressure Refrigerant Using Thermochromic Liquid Crystals," ***Int. J Heat Mass Transfer***, **60**, pp. 188-200, 2013.
15. E. Tijerino*, S. Basu and R. Kumar, "Nanoparticle agglomeration in an evaporating levitated droplet for different acoustic amplitudes," ***J Applied Physics***, **113**, 034307, 2013.
16. J. Lee* and R. Kumar, "Laboratory Study of Hydrogen Sulfide Removal in Slug Flows in a High Pressure Crude Oil Loop," ***J. Petroleum Science and Engineering***, **103**, pp. 72–79, 2013.
17. D. Vazquez* and R. Kumar, "Surface Effects of Ribbon Heaters on Critical Heat Flux in Nanofluid Boiling," ***Int. Comm. Heat Mass Transfer***, **41**, pp. 1–9, 2013.
18. R. Shabani, R. Kumar and H.J. Cho, "Droplets on liquid surfaces: Dual equilibrium states and their energy barrier," ***Appl. Phys. Lett***, **102**, 184101, 2013.
19. P. Deepu*, S. Basu and R. Kumar, "Dynamics and Fracture of ligaments from a droplet on a vibrating surface," ***Physics of Fluids***, **25**, 082106, 2013.
20. J.D. Wehking*, L. Chew and R. Kumar, "Droplet deformation and manipulation in an electrified microchannel," ***Appl. Phys. Lett***, **103**, 054101, 2013.
21. J.D. Wehking*, M. Gabany*, L. Chew, R. Kumar, "Effects of viscosity, interfacial tension, and flow geometry on droplet formation in a microfluidic T-junction," ***Microfluidics and Nanofluidics,*** DOI 10.1007/s10404-013-1239-0, 2013**.**
22. J. Lee*, S. Basu and R. Kumar, "Comparison and Cross-Validation of Optical Techniques in Different Swirl Spray Regimes," ***Atomization and Sprays***, **23**(8), pp.697-724, 2013.

23. J. Wilson*, J.D. Wehking* and R. Kumar, “Uniform alumina microspheres from Temperature Induced Forming in a microfluidic T-junction,” ***Appl. Phys. Lett.***, **103**, 203115, 2013.

2012

24. A. Saha*, J. Lee*, S. Basu and R. Kumar, "Breakup and Coalescence Characteristics of a Hollow Cone Swirling Spray," ***Physics of Fluids,*** **24**, 124103, 2012.
25. P. Deepu*, S. Basu, A. Saha* and R. Kumar, “Spreading and Atomization of Droplets on a Vibrating Surface in a Standing Pressure Field,” ***Applied Physics Letters***, **101**, 143108, 2012.
26. X. Gu*, S. Basu and R. Kumar, “Correlations of Vaporization Performance of Conventional and Biofuel Sprays in a Crossflow Heated Chamber,” ***Int. Comm. Heat Mass Transfer***, **39**, Issue 10, pp. 1478–1486, 2012.
27. A. Saha*, S. Basu and R. Kumar, “Velocity and Rotation Measurements in Acoustically Levitated Droplets,” ***Physics Letters A***, **376**, Issue 45, pp. 3185-3191, 2012.
28. A. Saha*, S. Basu and R. Kumar, “Scaling Analysis: Equivalence of Convective and Radiative Heating of Levitated Droplet,” ***Applied Physics Letters***, **100**, 204104, 2012.
29. A. Saha*, S. Basu and R. Kumar, “Effects of Acoustic Streaming-induced Flow in Evaporating Nanofluid Droplets,” ***J Fluid Mechanics***, **692**, pp. 207-219, 2012.
30. X. Gu*, S. Basu and R. Kumar, “Dispersion and Vaporization of Biofuels and Conventional Fuels in a Crossflow Pre-mixer,” ***Int. J Heat Mass Transfer***, **55**, Issues 1-3, pp. 336-346, 2012; also featured online on Renewable Energy Global Innovations http://reginnovations.com
31. S. Basu, A. Saha* and R. Kumar, “Thermally Induced Secondary Atomization of Droplet in an Acoustic Field,” ***Applied Physics Letters***, **100**, Issue 5, 054101, 2012.
32. A. Saha*, S. Basu and R. Kumar, “Particle Image Velocimetry and Infrared Thermography in a Levitated Droplet with Nanosilica Suspensions,” ***Experiments in Fluids***, **52**, pp. 795-807, 2012.
33. X. Gu, S. Basu and R. Kumar, “Vaporization and Collision Modeling of Liquid Fuel Sprays in a Co-axial Fuel and Air Pre-mixer,” ***Int. J Heat Mass Transfer***, 55, Issues 19-20, pp. 5322-5335, 2012.

2011

34. E. Yakshi-Tafti*, R. Kumar and H.J. Cho, “Measurement of Surface Interfacial Tension as a function of temperature Using Pendant Droplet Images,” ***Int. J. Optomechatronics***, **5**, pp. 393-403, 2011.
35. N. Aminimanesh*, S. Basu and R. Kumar, “Modeling of a Reacting Nanofilm on a Composite Substrate,” ***Energy***, **36**, Issue 3, pp. 1688-1697, 2011.

36. L.Zea*, D. Cooper and R. Kumar, "Hydrogen Sulfide Absorption Phenomena in Brine/Oil Mixtures," ***SPE Journal***, **16** (4), pp. 931-939, 2011.

37. A.Gupta* and R. Kumar, "Two-Dimensional Lattice Boltzmann Model for Droplet Impingement and Breakup in Low Density Ratio Liquid," ***Comm. Comp. Phys***., **10**, pp. 767-784, 2011.

38. E. Yakshi-Tafti*, H.J. Cho and R. Kumar, "Diffusive Mixing through Velocity Profile Variation in Microchannels," ***Experiments in Fluids***, **50**, #3, pp. 535-545, 2011.

39. E. Yakshi-Tafti*, H.J. Cho and R. Kumar, "Backward Facing Step Flow in Microchannels Using Particle Image Velocimetry," ***J Thermophysics and Heat Transfer***, **25**, #1, pp. 96-103, 2011.

40. E. Yakshi-Tafti*, G. Londe, A. Chunder, L. Zhai, R. Kumar and H.J. Cho, "Wettability Control and Flow Regulation using a Nanostructure-embedded Surface," ***J. Nanoscience and Nanotechnology***, **11**, pp. 1-4, 2011.

2010

41. R. Kumar, E. Tijerino*, A. Saha* and S. Basu, "Structural morphology of acoustically levitated and heated nanosilica droplet," ***Applied Physics Letters***, **97**, 123106, 2010.

42. A.Saha*, S. Basu, C. Suryanarayana and R. Kumar, "Experimental Analysis of Thermophysical Processes in Acoustically Levitated Heated Droplets," ***Int. J. Heat Mass Transfer***, **53**, pp.5663-5674, 2010.

43. A.Gupta* and R. Kumar, "Flow Regime Transition at High Capillary Numbers in a Microfluidic T-junction: Viscosity Contrast and Geometry Effect," ***Physics of Fluids***, **22**, 122001, 2010.

44. N. Aminimanesh*, S. Basu and R. Kumar, "Experimental Flame Speed in Multi-Layered Nano-Energetic Materials," ***Combustion and Flame***, **157**, # 3, pp. 476-480, 2010.

45. S.M.S. Murshed, K. Vereen*, D. Strayer and R. Kumar, "Experimental Investigation of Bubble Nucleation of a Refrigerant in Pressurized Boiling Flows," ***Energy***, **35**, pp.5143-5150, 2010.

46. A.Saha*, R. Kumar and S. Basu, "Infrared thermography and numerical study of vaporization characteristics of pure and blended bio-fuel droplets," ***Int. J. Heat and Mass Transfer***, **53**, pp. 3862-3873, 2010.

47. A.Gupta* and R. Kumar, "Effect of Geometry on Droplet Formation in the Squeezing Regime in a Microfluidic T-Junction," ***J Microfluidics Nanofluidics***, **8**, pp. 799-812, 2010.

48. E. Yakshi-Tafti*, H.J. Cho and R. Kumar, "Droplet Actuation on a Liquid Layer Due to Thermocapillary Motion: Shape Effect," ***Applied Physics Letters***, **96**, 264101, 2010.

49. L. Zea*, A.R. Diaz and C.K. Shepherd, R. Kumar, "Surface Extra Vehicular Activity Emergency Scenario Management: Tools, Procedures and Geologically-Related Implications," ***Acta Astronautica***, **67**, pp. 60-70, 2010.

50. A.Gupta* and R. Kumar, "Droplet impingement and breakup on a dry surface," ***Computers and Fluids***, **39**, Issue 9, pp. 1696-1703, 2010.

51. S. Basu, D. E. Lambe and R. Kumar, "Water Vapor and Carbon dioxide Species Measurements in Narrow Channels," ***Int. J Heat Mass Transfer***, **53**, Issue 4, pp. 703-714, 2010.

52. E. Yakshi-Tafti*, H.J. Cho and R. Kumar, "Impact of Drops on the Surface of Immiscible Liquids," ***J. Colloid and Interface Science***, **350**, pp. 373–376, 2010.

2009

53. E. Yakhshi-Tafti*, H.J. Cho, and R. Kumar, "Discrete Droplet Manipulation on Liquid Platforms using Thermal Gradients," ***Procedia Chemistry***, **1**, pp. 1519-1522, 2009.

54. A.Gupta*, S.M.S. Murshed^ and R. Kumar, "Droplet Formation and Stability of Flows in a Microfluidic T-Junction," ***Applied Physics Letters***, **94**, 164107, 2009.

55. R. Kumar and D. Milanova*, "Effect of Surface Tension on Nanotube Nanofluids," ***Applied Physics Letters***, **94**, p. 073107, 2009; also featured in *Virtual J Nanoscale Science and Technology*, Mar 2, 2009.

56. P. Sachdeva* and R. Kumar, "Effect of Hydration Layer and Surface Wettability in Enhancing Thermal Conductivity of Nanofluids," ***Applied Physics Letters***, **95**, 223105, 2009; also featured in *Virtual J Biological Physics*, Dec 15, 2009.

57. R. Kumar and D. Milanova*, "Dispersion and Surface Characteristics of Nano-Oxide Suspensions," ***Ann. N.Y. Acad. Sci.***, **1161**, pp.472-483, 2009.

58. X. Gu*, A. Gupta* and R. Kumar, "Lattice Boltzmann Simulation of Drop Collision and Surface Impingement at High Density Ratio," ***J. Thermophysics and Heat Transfer***, **23**, No. 4, pp. 773-785, 2009.

Prior to 2009

59. A.Mishra, N. Hasan, S. Sanghi and R. Kumar, "Two-Dimensional Buoyancy Driven Thermal Mixing in a Horizontally Partitioned Adiabatic Enclosure," ***Physics of Fluids***, **20**, 063601, 2008.

60. E.Yakshi-Tafti*, R. Kumar and J. Cho, "Effect of Laminar Velocity Profile Variation on Mixing in Microfluidic Devices-The Sigma Micromixer," ***Applied Physics Letters***, **93**, 143504, 2008.

61. D. Milanova* and R. Kumar, "Heat Transfer Behavior of Silica Nanoparticles in Pool Boiling Experiment," ***J. Heat Transfer***, **130**, 042401-2, 2008 (Top 10 Most Downloaded Articles -- April 2008).

62. A.Gupta* and R. Kumar, "Lattice Boltzmann Simulation to Study Multiple Bubble Dynamics," ***International J Heat and Mass Transfer***, **51**, pp.5192-5203, 2008.

63. A.Gupta* and R. Kumar, "Role of Brownian motion on the thermal conductivity enhancement of nanofluids," ***Applied Physics Letters***, 91, 223102, 2007.

64. A.Gupta* and R. Kumar, "Three-Dimensional Turbulent Swirling Flow in a Cylinder: Experiments and Computations," ***International J Heat and Fluid Flow***, 28, pp.249-261, 2007.

65. R. Kumar, A. Sleiti, J. Kapat, "Unsteady Laminar Buoyant Flow Through Rectangular Vents in Large Enclosures," ***J. Thermophysics and Heat Transfer***, **20**, No. 2, pp. 276-284, 2006.

66. D. Milanova* and R. Kumar, "Role of Ions in Pool Boiling Heat Transfer of Pure and Silica Nanofluids," ***Applied Physics Letters***, **87**, p. 233107, 2005.

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