

# *Journal of Enhanced Heat Transfer*

## CONTENTS VOLUME 20, 2013

---

### Page Range of Issues

**Issue 1: 1–94; Issue 2: 95–194; Issue 3: 195–287; Issue 4: 289–377; Issue 5: 379–461; Issue 6: 463–541**

---

### Number 1

#### **SPECIAL ISSUE: THE ENDURING RELEVANCE OF ENHANCED HEAT AND MASS TRANSFER**

<b>Current Progress and New Developments in Enhanced Heat and Mass Transfer</b> <i>A.E. Bergles &amp; R.M. Manglik</i>	<b>1</b>
<b>Comparison of Heat Removal Using Miniature Channels, Jets, and Sprays</b> <i>G.R. Warrier &amp; V.K. Dhir</i>	<b>17</b>
<b>Strategies for Developing Surfaces to Enhance Dropwise Condensation: Exploring Contact Angles, Droplet Sizes, and Pattering Surfaces</b> <i>S.S. Beaini &amp; V.P. Carey</i>	<b>33</b>
<b>Airside Performance of Fin-and-Tube Heat Exchangers Having Sine Wave or Sine Wave-Slit Fins</b> <i>N.H. Kim &amp; B. Youn</i>	<b>43</b>
<b>Measurement and Prediction of Vapor-Space Condensation of Refrigerants on Trapezoidal-Finned and Turbo-C Geometries</b> <i>M.A. Kedzierski, M.A. Carr, &amp; J.S. Brown</i>	<b>59</b>
<b>Symmetrical Porous Surfaces for Boiling Enhancement in Mini-Channels: Effects on Liquid Pressure Drop</b> <i>G. Carbajal, C.B. Sobhan, &amp; G.P. Peterson</i>	<b>73</b>
<b>Limitations of Compiling the Global Literature on Enhanced Heat and Mass Transfer</b> <i>R.M. Manglik, A.E. Bergles, A.J. Dongaonkar, &amp; S. Rajendran</i>	<b>83</b>
<b>Nanofluids, Heat-Transfer Equipment and Plain-Vanilla</b> <i>M.A. Kedzierski</i>	<b>93</b>

---

### NUMBER 2

<b>Heat Transfer Enhancement for Turbulent Mixed Convection in Reciprocating Channels by Various Rib Installations</b> <i>S-W. Perng &amp; H-W. Wu</i>	<b>95</b>
<b>Influence of Jet-to-Surface Distance and Frequency on Unsteady Heat Transfer and Mass Flow Rates in an Impingement Synthetic Jet</b> <i>F. Bazdidi-Tehrani, A. Eghbali, &amp; M. Karami</i>	<b>115</b>
<b>Computational Analysis of Trailing Edge Internal Cooling of a Gas Turbine Blade with Pin-Fin Arrays</b> <i>M-A. Moon &amp; K-Y. Kim</i>	<b>137</b>
<b>Experimental Study on Thermal Performance of Pulsating Heat Pipe with Al<sub>2</sub>O<sub>3</sub>-Deionized Water Nanofluid at Different Orientations</b> <i>B. Verma, V.L. Yadav, &amp; K.K. Srivastava</i>	<b>153</b>
<b>Heat Transfer during Pool Boiling of Water, Methanol, and R141B on Porous Coated Horizontal Tube Bundles</b> <i>J.T. Cieślinski &amp; K. Krasowski</i>	<b>165</b>

<b>Comparison of the Effects of Different Types of Tube Inserts on Two-Phase Flow Instabilities</b>	179
<i>G. Omeroglu, O. Çomaklı, S. Karagoz, &amp; S. Karsli</i>	

---

### NUMBER 3

<b>A Numerical Investigation of Flow Structure and Heat Transfer Enhancement in Square Ribbed Channels with Differently Positioned Deflectors</b>	195
<i>G. Xie, Sh. Zheng, B. Sundén, &amp; W. Zhang</i>	
<b>Al<sub>2</sub>O<sub>3</sub>—Water Nanofluid Falling-Film Flow and Heat Transfer Characteristics on a Horizontal Circular Tube</b>	213
<i>S. Jani</i>	
<b>Experimental Investigation on Flow Patterns and Pressure Drop of R134A Flow Boiling in a Horizontal Helically Coiled Pipe</b>	225
<i>L. Shao, J.T. Han, M.X. Wang, C.N. Chen, &amp; T.C. Jen</i>	
<b>Condensation Heat Transfer and Pressure Drop of R-410A in Three 7.0 mm Outer Diameter Microfin Tubes having Different Inside Geometries</b>	235
<i>N.H. Kim, H.W. Byun, &amp; J.K. Lee</i>	

---

### NUMBER 4

<b>Heat Transfer Enhancement Due to Swirl Effects in Oval Tubes Twisted about Their Longitudinal Axis</b>	289
<i>F. Bishara, M. A. Jog, &amp; R. M. Manglik</i>	
<b>An Experimental and Numerical Study of Flow and Heat Transfer in Ribbed Channels with Large Rib Pitch-to-Height Ratios</b>	305
<i>Sh. Li, Z. Ghorbani-Tari, G. Xie, &amp; B. Sundén</i>	
<b>Endwall Heat Transfer at the Turn Section in a Two-Pass Square Channel with and without Ribs</b>	321
<i>L. Wang, Z. Ghorbani-Tari, Ch. Wang, Z. Wu, &amp; B. Sundén</i>	
<b>Horizontal Convective Boiling of R134A, R1234YF/R134A, and R1234ZE(E) within a Micro-Fin Tube</b>	333
<i>M.A. Kedzierski &amp; K.-J. Park</i>	
<b>Improving Mini- and Microchannel Heat Transfer by Acoustic Fields</b>	347
<i>P.W. Higgins &amp; C.S. Lengsfeld</i>	
<b>Enhanced Heat Transfer in Corrugated-Plate Channels with Non-Newtonian Power-Law Fluid Flows</b>	361
<i>R.M. Manglik &amp; H.M. Metwally</i>	

---

### NUMBER 5

<b>Analysis of Numerical Results for a Two-Pass Trapezoidal Channel with Different Cooling Configurations of the Trailing Edge: Effect of Rib Inclination</b>	379
<i>W. Siddique, W.A. Khan, &amp; I. Haq</i>	
<b>Performance Evaluation of using Water-Based Nanofluid as Coolants in the Gas Cooler of a Transcritical CO<sub>2</sub> Refrigerant System</b>	389
<i>J. Sarkar</i>	
<b>Numerical Investigation of Turbulent Heat Transfer Enhancement in a Ribbed Channel with Upper-Downstream-Shaped Deflectors</b>	399
<i>Y. Song, Sh. Zheng, B. Sundén, G. Xie, &amp; H. Zhou</i>	

<b>Friction Factor Characteristics for Upward Single-Phase Flows inside Smooth and Microfin Tubes of a Double-Pipe Heat Exchanger for Heating/Cooling Conditions</b>	<b>413</b>
<i>A. Çebi, A. Celen, A.S. Dalkilic, &amp; S. Wongwises</i>	
<b>Experimental and Numerical Study of Heat Transfer over Finned Elliptical Flat Tube Fitted with Longitudinal Vortex Generators on the Rectangular Fin Surface</b>	<b>427</b>
<i>L. Li, X. Du, Y. Zhang, Ch. Xu, L. Yang, &amp; Y. Yang</i>	
<b>Effect of Number of Turns on the Temperature Pulsations and Corresponding Thermal Performance of Pulsating Heat Pipe</b>	<b>443</b>
<i>V.K. Karthikeyan, K. Ramachandran, B.C. Pillai, &amp; A. Brusly Solomon</i>	
<b>Feasibility of Porous Copper Fiber Sintered Sheets (PCFSSS) in a Plate Heat Exchanger for Enhancing Heat Transfer</b>	<b>453</b>
<i>Z. He, D. Li, L. Cao, &amp; Y. Tang</i>	

---

## NUMBER 6

---

<b>Effects of Different Thermal Conductivity Enhancers on the Thermal Performance of Two Organic Phase-Change Materials: Paraffin Wax RT42 and RT25</b>	<b>463</b>
<i>Y. Li &amp; S. Liu</i>	
<b>Two-Dimensional Heat Conduction in a Two-Conductor Laminate with Functionally Graded Properties</b>	<b>475</b>
<i>A. Radzikowska &amp; A. Wirowski</i>	
<b>Experimental Investigation of the Working Performance of a Novel Miniature Loop Heat Pipe</b>	<b>481</b>
<i>X.-W. Wang, Z.-P. Wan, &amp; Y. Tang</i>	
<b>Enhanced Heat and Mass Transfer in a Solar Still with a Porous-Fin Lattice Basin</b>	<b>491</b>
<i>P.K. Srivastava, S.K. Agrawal, &amp; M.K. Pandey</i>	
<b>Solar Calorimeter for Thermal Testing of Glazings</b>	<b>499</b>
<i>E.V. Macias-Melo &amp; J.J. Flores-Prieto</i>	
<b>Hydrodynamics and Heat Transfer in Tubes with Smooth and Ribbed Twisted Tape Inserts</b>	<b>511</b>
<i>A.B. Yakovlev, S.E. Tarasevich, A.A. Giniyatullin, &amp; A.V. Shishkin</i>	
<b>Heat Transfer and Hydraulic Resistance in Single-Phase Forced Convection in Annular Channels with Twisting Wire Inserts</b>	<b>519</b>
<i>A.B. Yakovlev</i>	
<b>Performance Tests of Defrosting Plates Designed with a Pulsating Heat Pipe (PHP) as the Heat Carrier</b>	<b>527</b>
<i>C-I. Chao, W-K. Lin, T-Yu. Hsiung, K.C. Liaw, M. Wang, Y.C. Yeh, H-C. Sheng, S-I. Chen, &amp; S.W. Chen</i>	

# *Journal of Enhanced Heat Transfer*

## AUTHOR INDEX VOLUME 20

Page Range of Issues		
<b>Issue 1: 1-94; Issue 2: 95-194; Issue 3: 195-287; Issue 4: 289-377; Issue 5: 379-461; Issue 6: 463-541</b>		
Agrawal, S.K., 491	Karagoz, S., 179	Siddique, W., 379
Bazdidi-Tehrani, F., 115	Karami, M., 115	Sobhan, C.B., 73
Beaini, S.S., 33	Karsli, S., 179	Song, Y., 399
Bergles, A.E., 1, 83	Karthikeyan, V.K., 443	Srivastava, P.K., 491
Bishara, F., 289	Kedzierski, M.A., 59, 93, 333	Srivastava, K.K., 153
Brown, J.S., 59	Khan, W.A., 379	Sundén, B., 195, 305, 321, 399
Brusly Solomon, A., 443	Kim, K-Y., 137	Tang, Y., 453, 481
Byun, H.W., 235	Kim, N.H., 43, 235	Tarasevich, S.E., 511
Carbajal, G., 73	Krasowski, K., 165	Tezel, T., 267
Cao, L., 453	Lee, J.K., 235	Uysal, Ü., 277
Carey, V.P., 33	Lengsfeld, C.S., 347	Verma, B., 153
Carr, M.A., 59	Li, D., 453	Wan, Z.-P., 481
Çebi, A., 413	Li, L., 427	Wang, Ch., 321
Celen, A., 413	Li, Sh., 305	Wang, L., 321
Chao, C-I., 527	Liaw, K.C., 527	Wang, M., 527
Chen, C.N., 225	Lin, W-K., 527	Wang, M.X., 225
Chen, S-I., 527	Liu, S., 463	Wang, X.-W., 481
Chen, S.W., 527	Ki, Y., 463	Warrier, G.R., 17
Cieśliński, J.T., 165	Macias-Melo, E.V., 499	Wirowski, A., 475
Çomaklı, O., 179	Manglik, R.M., 1, 83, 289, 361	Wongwises, S., 413
Dalkilic, A.S., 413	Metwally, H.M., 361	Wu, H-W., 95
Dhir, V.K., 17	Moon, M-A., 153	Wu, Z., 321
Dogan, A., 267	Omeroglu, G., 179	Xie, G., 195, 305, 399
Dongaonkar, A.J., 83	Pandey, M.K., 491	Xu, Ch., 427
Du, X., 427	Park, K.-J., 333	Yadav, V.L., 153
Eghbali, A., 115	Perng, S-W., 95	Yakovlev, A.B., 511, 519
Flores-Prieto, J.J., 499	Peterson, G.P., 73	Yang, L., 427
Ghorbani-Tari, Z., 305, 321	Pillai, B.C., 443	Yang, Y., 427
Giniyatullin, A.A., 511	Radzikowska, A., 475	Yeh, Y.C., 527
Han, J.T., 225	Rajendran, S., 83	Youn, B., 43
Haq, I., 379	Ramachandran, K., 443	Zhang, J-Z., 251
He, Z., 453	Sarkar, J., 389	Zhang, W., 195
Higgins, P.W., 347	Shan, Y., 251	Zhang, Y., 427
Hsiung, T-Yu., 527	Shao, L., 225	Zheng, Sh., 195, 399
Jani, S., 213	Sheng, H-C., 527	Zhou, H., 399
Jen, T.C., 225	Shishkin, A.V., 511	

# *Journal of Enhanced Heat Transfer*

## SUBJECT INDEX VOLUME 20

Page Range of Issues		
<b>Issue 1: 1–94; Issue 2: 95–194; Issue 3: 195–287; Issue 4: 289–377; Issue 5: 379–461; Issue 6: 463–541</b>		
active technique, 347 additives, 213 aluminum-foam, 267 augmentation, 83 axial thermal resistance, 527 base heat loss, 491 Carbon Dioxide, 389 Cassie–Baxter, Wenzel, 33 circulatory flow, 443 closed-loop heat pipe, 443 coefficient, 43, 153, 251 coiled tubes, 225 composite materials, 475 compound enhancement, 427 compound technique, 195, 399 condensation, 1, 33, 235 conduction efficiency, 463 contact angle, 33 convection, 1, 195, 213, 267, 277, 289, 361 cooling, 251 cooling channel, 305 cooling technology, 195 design optimization, 481 digital library, 83 displaced enhancement, 195, 453, 519 electronic cooling, 17, 267, 481 enhancement device, 251 equipment, 93 extended surface, 235, 267, 333, 427, 463, 491 falling-film, 213 flow boiling, 1, 333 flow characteristics, 195 flow pattern, 115, 511 fluid vibration, 347 forced convection boiling, 179, 277 fouling, 1 frictional loss prediction, 225 gas turbine, 251, 277, 321, 379 graded laminates, 475 heat exchanger, 43 heat sink, 267 impinging jet, 115 intensification, 83 internal cooling, 137 jet impingement, 17, 277 Large-eddy simulation (LES), 95 liquid additives, 389 liquid crystal method, 321 liquid crystal thermography (LCT), 277, 305 literature survey, 83 low-finned tube, 59 low-GWP refrigerant, 333 manufacturing technique, 453 melting and freezing, 463, 527 microfluidics, 347 mini-channel, 73 multi-tooth tool, 453 nanofluids, 93, 153 nanolubricants, 93 numerical simulation, 305 Nusselt number, 115 operating temperatures, 491 optimization, 289 oscillatory flow, 443 Ostwald–de Waele fluid, 361 outdoor hot box testing, 499 outdoor thermal testing, 499 overall performances, 195 passive enhancements, 443, 481, 511, 519 passive technique, 165, 225, 235 performance evaluation, 289 pin-fin arrays, 137 pitch-to-height ratio, 305 pool boiling, 165 porous-metal fins, 267 pressure drop, 43, 73, 379, 453 pseudoplasticity, 361 pulsating heat pipe, 153 railing edge, 137 RANS equations, 137 reciprocating channel, 95 recirculating flow, 399 refrigerant mixtures, 333 refrigeration, 389 ribbed channel, 195 rib land, 95 rib pitch, 95 rib turbulator, 305 rough surface, 179, 195, 321, 379 Shear stress transport (SST), 137 shear-thinning fluid, 361 sine wave, 43 single-phase flow, 251, 321, 379, 389, 399, 427, 511, 519 sintered porous fiber plate, 453 slit, 43 small channels, 17 solar calorimeter, 499 solar heat gain coefficient, 499 spray cooling, 17 start-up, 153 structured ribs, 321 structured roughness, 399 surface tension device, 443, 527 survey, 1 swirl-force device, 179, 289, 361, 511, 519 synthetic jet, 115 tension devices, 481 theoretical analysis, 213 thermal energy storage, 463 thermal inertia, 491 thermal resistance, 153, 527 thermal performance, 399 tolerance modeling, 475 treated surface, 165 tube bundle, 165 tube-in-tube gas cooler, 389 Turbo-CII, 59 turbulence model, 115, 137 twisted-tape insert, 179 two-phase flow, 179, 225, 235, 347, 443, 511 ultrasonic, 347 unsteady Reynolds averaged Navier–Stokes (URANS), 115 vortex generators, 427 water purification, 491 wick structure, 73 wire-coil insert, 179 working fluid, 153		