

# **2010 3rd International Conference on Thermal Issues & Emerging Technologies Theory and Applications**

**(Tj ETA 2010)**

**Cairo, Egypt  
19 – 22 December 2010**



**IEEE Catalog Number: CFP1098B-PRT  
ISBN: 978-1-61284-268-4**

## Table of Contents

|          |  |     |
|----------|--|-----|
|          | <b>Keynote talk 1: Heat and mass transfer in hydrogen storage devices with complex hydrides; Srinivassa Murthy S.</b>  | 1   |
|          | <b>Keynote: Zero-Emission Datacenter and 3D Chip Stacking, Michel, B.</b>  | 3   |
| <b>B</b> | <b>Electronics cooling Chair: Srinivassa Murthy, S.</b>  |     |
| 18       | <b>Keynote: Immersion cooling nucleate boiling of high power chips; El-Genk M. S.</b>  | 5   |
| 52       | <b>Keynote: Modeling conjugate heat transfer; Sabry M.N.</b>   | 7   |
| 53       | Advanced Liquid Cooling of Multi Chip Modules for Concentrated Photovoltaic Electric and Thermal Power Co-Generation; Escher W., Ghannam R., Khalil A., Paredes S., Michel B.                  | 9   |
| 24       | Parametric study of pool boiling from porous graphite foams in dielectric liquids; Jin L.W., Pranoto I., Leong K.C., Chai J.C.   | 19  |
| <b>C</b> | <b>Microchannels and heat pipes Chair: Michel, B.</b>  |     |
| 44       | Effect of tube diameter on Elongated Bubble Length in Mini channels; Venkateshan M., Balakrishnan A.R., Kumar das S.   | 27  |
| 26       | Flow Patterns and Flow Pattern Maps for Microchannels; Ali R., Palm B., Martin-callizo C., Maqbool M.  | 33  |
| 58       | Copper Micro-channel Thermosyphon Fins for Heat Sink Application; Alam K., Flores J., Urieli I.  | 43  |
| 19       | Theoretical and experimental study on the thermal performance of flat miniature heat pipes including rectangular axial capillary microchannels; Mansouri J., Sassi M., Maalej S., Zaghdoudi M. | 51  |
| <b>D</b> | <b>Thermal management Chair: Yazawa, K.</b>  |     |
| 67       | Joule Heating and Gold RF MEMS Switch Behavior; Rezvanian O., Zikry M.A.   | 63  |
| 23       | Thermo-mechanical analysis of 3-D multilayer structures for power electronic devices; Bagnoli P.E., Girardi M., Padovani C., Pagni A., Pasquinelli G.  | 69  |
| 7        | Chimney effect on natural air cooling of electronic equipment under inclination; Ishizuka M., Hatakeyama T., Nakagawa S., Kitamura Y., Funawatashi Y.  | 77  |
| 21       | Thermal management of personal computer; Abbas T., Abdel-salam K., Khedairy K.   | 85  |
| 84       | Dynamics of cold aisle air distribution in a raised floor data center; Kumar P, Sundaralingam V, Joshi Y   | 95  |
| <b>E</b> | <b>Thermal issues at small scales Chair: Ragai, H.F.</b>   |     |
| 45       | Counter Based CMOS Temperature Sensor for Low Frequency Applications; Fathy O., Abdallah A., Wassal A., Ismail Y.  | 103 |
| 54       | Molecular dynamics simulations of oblique phonon scattering at semiconductor interfaces; Goicochea J.V., Michel B., Amon C.  | 111 |
| 68       | Specific Heat in Nanostructures by Quantum Mechanics; Prevenslik T.  | 117 |
| 65       | Fractal Topologies for Efficient Solar Energy Harvesting Systems; Abdel rahman H., Kirah K.  | 123 |
| <b>F</b> | <b>Microfluidics Chair: Khater, H.</b>   |     |
| 12       | Numerical simulation of heat transfer in aseptic processing operations involving non-Newtonian Fluids; Krishnan S., Kannan A.  | 127 |
| 51       | Droplet dynamics over a super hydrophobic surface; Sabry M.N., Elgharieb E.  | 137 |
| 6        | A new technique for non-catalytic after-treatment system of diesel particulates; Yamamoto K, Fujikake F, Matsui K  | 145 |
| 73       | Thermohydrodynamic behaviour of a thin lubricant film; Laraqi N., Rashidi M.M., Garcia de maria J.M., Bairi A.   | 151 |

| <b>G Heat Transfer enhancement Chair: AbdelGhani, S.</b> |  |     |
|--|--|-----|
| 61   | Measurement of performance of very high effectiveness heat exchangers; Meher R.S., Murthy S.S., Venkatarathnam G.  | 157 |
| 60   | Optimum design of matrix heat exchanger geometry; Bhanumurthy K.A., Murthy S.S., Venkatarathnam G.   | 163 |
| 33   | Experimental Study on Convection Heat Transfer of Single Fin Duct with Pulsated Airflow; Li S., Arik M., Uttarkar Y.   | 171 |
| 36   | Numerical analysis of heat transfer and flow field of pulsating flow in a transverse tube; Yu J., Lin W., Wu Y., Xu J., Yang X., Gao J., Yang W., Liu L.   | 179 |
| 83   | Natural Convection Heat Transfer From a Heat Sink with Hollow/Perforated Circular Pin Fins; ElShafei E   | 185 |
| <b>H Phase change Chair: Sabry, M. N.</b>                |  |     |
| 72   | Two-dimensional Front-Tracking model for Film Evaporation; Guignard S., Shawky O., Tachon L., Abdel-salam K., Sabry M.N.   | 195 |
| 14   | Modeling of growth and motion of equiaxed dendrites in a convecting alloy melt; Bhattacharya A., Shyamprasad K., Dutta P.  | 201 |
| 62   | Experimental and numerical investigation of evaporative heat transfer in the vicinity of the 3-phase contact line; Ibrahim K., Abd rabbo M.F., Gambaryan-roisman T., Stephan P.                              | 207 |
| 42   | Experiments on the characteristic of saturated boiling heat transfer in a plate heat exchanger for Ammonia/Lithium Nitrate and Ammonia/(Lithium Nitrate+water); Oronel C., Amaris C., Valles M., Bourouis M. | 217 |
| 3  | On forced convective heat transfer of paraffin Slurry in a vertical rectangular channel; Elboujaddaini M., Haberschill P., Mimet A.  | 227 |
| <b>I Energy conservation Chair: Elkady, M.</b>           |  |     |
| 17   | <b>Keynote: Energy-performance of air conditioned buildings: The green buildings dream; Khalil E.</b>  | 235 |
| 46   | Energy efficiency improvement by housekeeping measures; Aly A.Z.   | 245 |
| 69   | Thermal Design of a Modern, Two Floor, Zero Energy House in a Desert Compound; Serageldin A.   | 257 |
| 70   | Influence of site on thermal design of a two floor ZEH in the desert; Serageldin A.  | 267 |
| <b>J Panel: Energy policy Chair: Mahgoub, M.</b>         |  |     |
|  | <b>Keynote: Prospects for nuclear power in the middle east and north Africa, El-Genk, M.</b>   | 275 |
| 13   | <b>Keynote: Renewable energy in Egypt: Challenges and prospects; Elkhayat M., Ameen E.</b>   | 277 |
|  | <b>Keynote: Strategy of power sector and regulatory framework in Egypt; ElSalmawy, H.</b>  | 281 |
| <b>K Renewable energy 1 Chair: ElSalmawy, H.</b>         |  |     |
| 56   | System Optimization of Hot Water Concentrated Solar Thermoelectric Generation; Yazawa K., Shakouri S.  | 283 |
| 34   | Rigorous Optimization Procedure for Inhomogeneous Thermoelectric Converters; Gerstenmaier Y., Lampenscherf S.  | 291 |
| 16   | Effect of orientation on the performance of H <sub>2</sub> /Air PEM fuel cell; Abdel-sabour A., Elemam S.H., Awad M.   | 301 |
| 103  | Optimization of a-SiGe solar cells for tandem structures; Tobail O., Kim J & Sadana D.   | 309 |

|          |   |                               |     |
|----------|---|-------------------------------|-----|
| <b>L</b> | <b>Renewable energy 2</b>   | <b>Chair: Serag Eldin, A.</b> |     |
| 30       | 21st Century Challenges of Clean Energy and Global Warming-Can energy storage systems meet these issues?; Singh B., Singh O.  |                               | 323 |
| 77       | Technical and economic analysis of a solar –assisted air-conditioning system; Sayadi Z., El May S., Bourouis M., Bellagi A.   |                               | 331 |
| 29       | Theoretical Turbine Power Yield in Solar Chimney Power Plants; Koonsrisuk A., Chitsomboon T.  |                               | 339 |
| <b>M</b> | <b>Heat Transfer Fundamentals</b>   | <b>Chair: Gorla, R.</b>       |     |
| 80       | <b>Keynote: Measurements of heat transport in thin films by ultrafast laser-based techniques; Elsayed-Ali H.</b>  |                               | 347 |
| 4        | On the synergy field between velocity field and temperature gradient in turbulent vortical flow; Habchi C., Lemenand T., Della valle D., Peerhossaini H.  |                               | 353 |
| 47       | The Effects of Evaluation Methods on Convective Heat Transfer Coefficients of Mini-Channel Tube Bundles; Nam K.W., Min J.K., Jeong J.H., Kim K.S., Ha M.Y.  |                               | 361 |
| 64       | Heat Transfer for Laminar Thermally Developing Flow in Parallel-Plates Using the Asymptotic Method ; Awad M.M.  |                               | 371 |
| <b>N</b> | <b>Processes heat Transfer</b>  | <b>Chair: Elsayed-Ali, H.</b> |     |
| 10       | Studies on drying kinetics of solids in a rotary dryer; Linga A., Sai P.S.T.  |                               | 389 |
| 75       | Uniform and non-uniform inlet temperature of a vertical hot water jet injected into a rectangular tank; El-Amin M.F., Sun S.  |                               | 395 |
| 20       | A numerical investigation of external cooling on blown film cooling; Abdelmaksoud M., Abdel-salam K. Awad M.  |                               | 405 |
| 66       | Natural convection cooling for LEU irradiated fuel plates; Abou el maaty T.   |                               | 413 |
| 82       | Theoretical and Experimental Investigation on the Performance of Hybrid Desiccant Air Conditioning System Using Activated Alumina in a Radial Flow Packed Bed; Ramadan W., Hamed A., Elemam S., Awad M.M. |                               | 419 |
| <b>O</b> | <b>Porous media</b>   | <b>Chair: Ghoneim, Z.</b>     |     |
| 79       | <b>Keynote: Two-Phase Co- and Counter-Current Imbibition in a Porous Medium; El-amin M.F., Sun S.</b>   |                               | 431 |
| 5        | Reduction of boiling thermal hysteresis in immersed electronics cooling on micro-configured graphite metal composite surfaces; Yang W.J., Zhang N., Chao D., Torii S.                                     |                               | 433 |
| 49       | Experimental investigation of flow assisted mixed convection in high porosity metal foams; Kamath P., Balaji C., Venkateshan S.P.   |                               | 437 |
| 74       | Mixed convective boundary layer flow over a vertical wedge embedded in a porous medium saturated with a nanofluid; Gorla R., Shamkha A., Rashad A.M.  |                               | 445 |