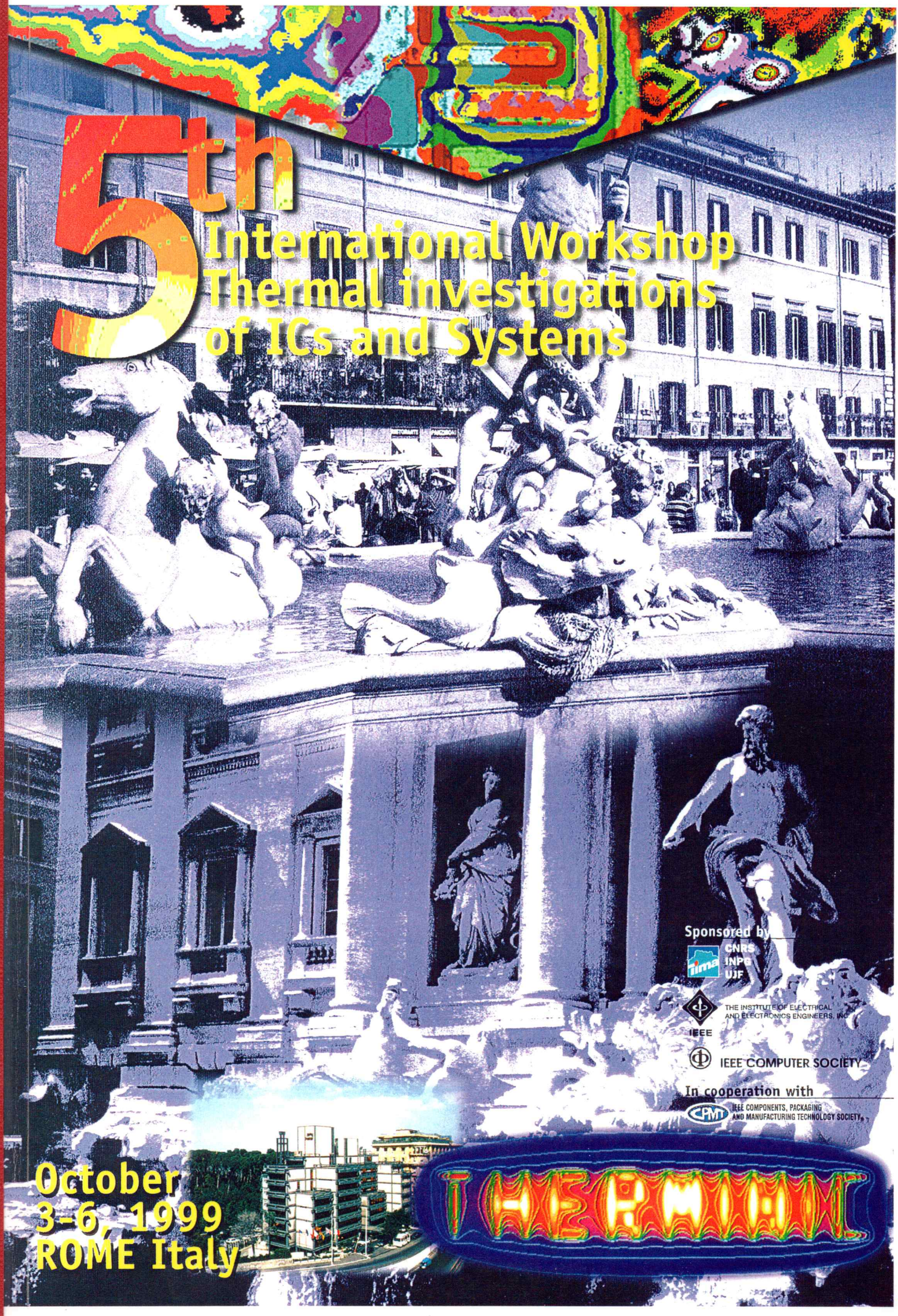
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Thermal investigations
of ICs and Systems
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October
3-6, 1999
ROME Italy
THERMINIC

5th International Workshop on THERMAL INVESTIGATIONS of ICs and MICROSTRUCTURES

October 3-6, 1999,
Rome, Italy.

Workshop Program

MONDAY 4 OCTOBER

8:00-9:30	**Registration**	
9:30-9:40	**Welcome address: B. Courtois**, General Chair, TIMA Laboratory, Grenoble, France	
9:40-10:20	**Invited talk: A. Bar-Cohen**, University of Minnesota, USA **Chair**: V. Székely, TU of Budapest, Hungary	**THERMAL PACKAGING FOR THE 21ST CENTURY: CHALLENGES AND OPTIONS**
10:20-12:00	**Session 1** **Chair: O. Slattery**, NMRC, Ireland	**ADVANCED MEASUREMENT TECHNIQUES**
10:20	**V. Székely[1], S. Ress[1], A. Poppe[1], S. Török[1], D. Magyari[1], Zs. Benedek[1], B. Courtois[2], M. Rencz[3]** [1]TU of Budapest, Hungary [2]TIMA, Grenoble, France [3]MicRed, Budapest, Hungary	**Transient thermal measurements for dynamic package modeling: new approaches**
10:40	**N. Trannoy, S. Gomès, P. Grossel** U. of Reims, France	**Thermal characterization of measurement by STM and STHM**
11:00	**M. Rohde** Forschungszentrum Karlsruhe, Germany	**Nondestructive testing and determination of thermal parameters in thin films and microcomponents**
11:20	**R. Grimes, M. Davies** U. of Limerick, Ireland	**PIV measurements of cooling fan aerodynamics**
11:40	**N. Mathis** Mathis Inst., Fredericton, Canada	**New instrument for thermal management design**
12:00-13:30	**Lunch**	
13:30-14:30	**Session 2** **Chair: D. De Cogan**, U. of East Anglia, United Kingdom	**TEMPERATURE MEASUREMENT AND MONITORING**

13:30	**M. Janicki, A. Napieralski** TU of Lodz, Poland	**New approach to electronic circuit temperature monitoring**
13:50	**R.A. Bianchi[1], J.M. Karam[1], B. Courtois[1], R. Nadal[2], F. Pressecq[3], S. Sifflet[4]** [1]TIMA, Grenoble, France [2]UPC Barcelona, Spain [3]CNES, Toulouse, France [4]TRS31, Auterive, France	**CMOS compatible temperature sensor with digital output for wide temperature range applications**
14:10	**H. Bellaj, J.M. Dorkel, P. Tounsi, Ph. Leturcq** LAAS, Toulouse, France	**Validity and limits of the junction temperature concept for integrated power devices**
14:30-14:50	**Coffee**	
14:50-15:10	**Embedded Tutorial** **C.P. Tso, S.P. Mahulikar**, Nanyang TU, Singapore **Chair: G. De Mey**, U. Gent, Belgium	**A SURVEY ON COUPLED TRANSPORT PROCESSES IN THIN LIQUID FILMS FOR MICROCHANNEL HEAT TRANSFER APPLICATION**
15:10-17:10	**Session 3** **Chair: G. De Mey**, U. Gent, Belgium	**ADVANCED COOLING TECHNOLOGIES**
15:10	**C. Perret[1,2], J. Boussey[2], Ch. Schaeffer[1], M. Coyaut[1]** [1]LEG, Grenoble, France [2]LPCS, Grenoble, France	**Integration of cooling devices in silicon technology**
15:30	**G.B. Russell, W.Z. Black, J.G. Hartley, A. Glezer** Georgia Inst. of Techno, Atlanta, USA	**Microjet cooling of single level integrated modules**
15:50	**P. Dziurdzia, A. Kos** U. of Mining and Metallurgy, Krakow, Poland	**Electrothermal macromodel of active heat sink for cooling process simulation**
16:10	**G.I. Sultan** Mansoura U., Egypt	**Enhancing forced convection heat transfer from multiple protruding heat sources simulating electronic components in a horizontal channel by passive cooling**
16:30	**D.G. Wang** NCR, San Diego, USA	**Expanding conventional system level forced air-cooling envelope**
16:50	**C.H. Amon** Carnegie Mellon U., Pittsburgh, USA	**Metrics for transient cooling of portable electronics**
17:15-19:00	**Poster session 1** **Chair: M. Rencz**, Techn. Univ. of Budapest, Hungary	

	N. Pesare, A. Giorgio, B.M. Bobbo, A.G. Perri Politecnico di Bari, Italy	**A new electrothermal simulator of GaAs MESFETs for optimal layout design of MMICs**
	K.O. Petrojanc[1], I.A. Kharitonov[1], P. Maltcev[1], N.I. Rjabov[1], L.N. Kravtchenko[2], A.N. Sapelnikov[2] [1]MUEM, Moscow, Russia [2]Science and Research Inst. of Molecular Electr., Moscow, Russia	**High-speed digital GaAs ICs electro-thermal simulation with PSPICE**
	T. Franke Siemens, München, Germany	**Thermal modelling of multichip assemblies**
	M.Rencz, V. Székely, Zs. Kohari, S. Ress, A. Pàhi, A. Poppe TU of Budapest, Hungary	**Thermal evaluation of the SIP9 package**
	S. Ramminger[1], J.G. Bauer[1], T. Scherg[1], H.J. Schulze[1], K. Mosig[2], G. Wachutka[3] [1]Siemens, München, Germany [2]Infineon, Villach, Austria [3]München U. of Techno., Germany	**Temperature behavior of power devices with copper metallisation using thermal simulation**
	R. Schacht[1], M. Kasper[2], H. Reichl[1] [1]TU of Berlin, Germany [2]TU Hamburg-Harburg, Germany	**Macro modelling for transient simulation of coupled electro-thermal problems for an IGBT module**
	E.W. Kreutz[1], N. Pirch[1], T. Ebert[2,3], R. Wester[2], B. Ollier[2,3], P. Loosen[2], R. Poprawe[1,2] [1]LLRWTH, Aachen, Germany [2]Fraunhofer-Inst. für Lasertechnik, Aachen, Germany [3]PROLAS, Aachen, Germany	**Simulation of micro-channel heat sinks for optoelectronic microsystems**
	S. Galliou, M. Mourey ENSMM, Besançon, France	**Simulation of thermal regulated ultra stable quartz oscillator**
	A.G. Madera, M.Sh. Sourgouladze Russian Acad. of Science, Moscow, Russia	**Stochastical temperature fields in ICs and electron modules and method for their calculation**
	A. Poppe, Gy. Csaba, K. Tarnay, V. Székely TU of Budapest, Hungary	**Considering electro-thermal interations in sub-micron n-MOS transistor on microscopi scale within a 3D particle dynamics based monte carlo simulator**
	F.H. Fernandez Morales, J. Samitier U. of Barcelona, Spain	**Thermal behaviour of a bioparticle microhandler: a transient approach**

	D. Fedasyuk, E. Levus, M. Mykhalchuk, D. Petrov State U. Lvivska Polytech, The Ukraine	**Modelling and analysis of methods of providing thermal performance of flip-chip structure**
	E. Chen Xiansong Hewlett-Packard, Singapore	**Thermal performance study for a MCMS infrared transceiver by FEM**
	J. Diefenbach[1], F. Hiller[2], R. Vahrmann[2] [1]DaimlerChrysler, Frankfurt, Germany [2]TEMIC, Heilbronn, Germany	**THERESCA: a tool to calculate the thermal resistance of an electronic package**
19:00	**Reception**	

TUESDAY 5 OCTOBER

8:30-9:10	**Invited talk: J. Rantala**, Nokia, Helsinki, Finland **Chair: C. Lasance**, Philips, Eindhoven, The Netherlands	**NEEDS AND TRENDS IN INDUSTRIAL THERMAL MANAGEMENT OF ELECTRONICS**
9:10-11:10	**Session 4** **Chair: J.M. Dorkel**, LAAS, Toulouse, France	**ELECTRO-THERMAL SIMULATION**
9:10	**M.N. Sabry[1], H. Haddara[2], K. Abdel-Salam[3], M. Awad[1], A. Nasser[3]** [1]Mansoura U., Egypt [2]Mentor Graphics, Egypt [3]Tenth of Ramadan Higher Tech. Inst., Egypt	**Investigation of self heating in SIMOX transistors operated at high temperatures using a boundary value problem formulation**
9:30	**P. Tounsi, K. Bellil, J.M. Dorkel** LAAS-INSAT, Toulouse, France	**Transient electrothermal computation: large power IGBT and MOS modules in on-state operating conditions**
9:50	**C. Harlander[1], R. Sabelka[1], R. Minixhofer[2], S. Selberherr[1]** [1]TU Vienna, Austria [2]Austria Mikro Systeme Intl, Unterpremstätten, Austria	**Three-dimensional transient electro-thermal simulation**
10:10	**D. D'Amore, P. Maffezzoni** Politecnico di Milano, Italy	**Electro-thermal analysis of paralleled bipolar devices**
10:30	**M. Jakovljevic, P. Fotiu, Z. Mrcarica, H. Detter** TU Wien, Austria	**A method for simultaneous 3D electro-thermal simulation of microsystems**
10:50	**G. Breglio[1], F. Frisiana[2], A. Magri[2], P. Spirito[1]**	**Thermal mapping of new cellular power MOS affected by electro-thermal instability**

	[1]U. of Napoli, Italy [2]STMicroelectronics, Catania, Italy	
11:10-11:30	**Coffee**	
11:30-13:10	**Session 5** **Chair: K. Azar**, Lucent Technologies, Andover, USA	**EXPERIMENTAL VALIDATION OF NUMERICAL ANALYSIS**
11:30	**M.N. Sabry** Mansoura U., Egypt	**Scale effects on fluid flow and heat transfer in micro-channels**
11:50	**D. Newport[1], M. Davies[1], T. Dalton[1], M. Whelan[2]** [1]U. of Limerick, Ireland [2]Joint Research Centre, Ispra, Italy	**An optical and numerical investigation into the temperature and velocity fields about an enclosed PCB with an array of simulated 2D components in free convection**
12:10	**J. Lohan, P. Tiilikka, C.M. Fagar, J. Rantala** Nokia, Helsinki, Finland	**Effect of PCB thermal conductivity on the operating temperature of an SO-8 package in a natural convection environment: experimental measurement versus numerical prediction**
12:30	**P. Rodgers[1], J. Lohan[2], V. Eveloy[2]** [1]U. of Limerick, Ireland [2]Nokia, Helsinki, Finland	**Impact of both convective environment and PCB conductivity on the distribution of heat transfer from three electronic component package types-operating on single-and multi-component printed circuit boards**
12:50	**D. Agonafer[1], R. Schmidt[1], A. Free[2]** [1]IBM, Poughkeepsie, USA [2]Maya Heat Transfer Technologies, USA	**A coupled conjugate model of the internal and external resistance of a TCM**
13:15-14:15	**Lunch**	
14:30-16:00	**Vendors' Session**	
16:00-17:20	**Session 6** **Chair: J.B. Saulnier**, ENSMA, Poitiers, France	**STUDIES ON THERMAL MATERIAL PARAMETERS**
16:00	**M. Malinski, L. Bychto** TU of Koszalin, Poland	**Photoacoustic studies of the absorption coefficient of CdTe**
16:20	**M. Malinski, L. Bychto** TU of Koszalin, Poland	**The influence of the quality of the semiconductor surface on the photoacoustic signal characteristics on the example of CdTe studies**
16:40	**A. Drushinin, Y. Pankov, I. Maryamova, Y. Khoverko** Lviv Polytech. State U., The Ukraine	**The Piezo-seebeck effect in p-type silicon**

17:00	**J. Zakrzewski[1], F. Firszt[1], S. Legowski[1], H. Meczynska[1], B. Sekulska[1], J. Szatkowski[1], W. Paszkowicz[2]** [1]Inst. of Physics, Torun, Poland [2]Polish Academy of Sciences, Warsaw, Poland	**Photoacoustic investigations of beryllium containing wide gap II-VI mixed crystals**
17:20-17:40	**Coffee**	
17:40-18:40	**Poster session 2** **Chair: M. Rencz**, Techn. Univ. of Budapest, Hungary	
	V.Székely[1], A. Nagy[1], S. Török[1], E. Nikodemusz-Székely[2], M.Rencz[3] [1]TU of Budapest, Hungary [2]Res. Inst. for Comp. Automation, Budapest, Hungary [3]MicRed, Budapest, Hungary	**Electrically controlled thermal resistance: an experiment**
	G.C. Albright[1], J.A. Stump[1], J.D. McDonald[1], H. Kaplan[2] [1]Quantum Focus Instr., Shelton, USA [2]Honeyhill Techn. Comp., Norwalk	**"True" temperature measurements on microscopic semiconductor targets**
	R. Houlihan, G. Kelly, C. Lyden NMRC, Cork, Ireland	**Development of behavioural models of resonant sensor elements subject to residual stress**
	V. Golembo, V. Kotlarov, S. Kharytonov State U. "Lviv Polytechnic", The Ukraine	**The piezoquartz temperature sensor's interfac modules**
	N.F. Strarodub, V.M. Starodub NASU, Kyiv, The Ukraine	**Microthermal enzymatic sensor for the express monitoring of the cyanide content in water**
	Yu.P. Dotsenko, T.Ya. Gorbach, L.O. Matveeva, P.S. Smertenko, S.V. Svechnikov, E.F. Venger NASU, Kyiv, The Ukraine	**Dimensionless sensitivity as a base for modeling of thermometric characteristics of thermodiode sensors**
	M. Davies, E. Kehoe, J. Punch U. of Limerick, Ireland	**Thermal gradients and electronic component reliability**
	N.R. Kamat Chartered Semiconductor, Singapore	**Investigating reliability on the 5 metal single poly 0.25um CMOS process**
	S. Volz[1], J.B. Saulnier[1], G. Chen[2], P. Beauchamp[3] [1]LET, Poitiers, France	**Computation thermal conductivity of superlattices by molecular dynamics technique**

	[2]UCLA, Los Angeles, USA [3]U. of Poitiers, Futuroscope, France	
	R.A. Bianchi, J.M. Karam, B. Courtois TIMA, Grenoble, France	**Pressure and temperature integrated measurement system for high temperature oil well applications based on ALC crystal oscillators**
	Ch. S. Roumenin, A. Ivanov, P. Nikolova Inst. of Control & System Research, Sofia, Bulgaria	**Thermogradiometer sensor based on differential microdiode**
	M. Strasser[1,2], F. Flötz[1], R. Aigner[1], G. Wachutka[2] [1]Infineon, München, Germany [2]München U. of Techno., Germany	**Device performance of CMOS low power thermoelectric generators**
19:00-20:30	**Diner**	
20:30	**Panel** **Moderator: D. Agonafer**, IBM, Poughkeepsie, USA *Panelists:* J. Parry, Flomerics, Hampton Court, United Kingdom J. Rantala, Nokia, Helsinki, Finland K. Azar, Lucent Technologies, Andover, USA H. Pape, Infeneon, München, Germany J. Janssen, Philips, Nijmegen, The Netherlands C. Villa, STMicroelectronics, Agrate Brianza, Italy T. Tarter, AMD, Sunnyvale, USA	**WHAT ARE THE EXPECTATIONS OF THE ELECTRONICS INDUSTRY FROM THE THERMAL ACADEMIC COMMUNITY ?**

WEDNESDAY 6 OCTOBER

9:00-9:40	**Invited talk: E. Suhir**, Lucent Technologies, Murray Hill, USA **Chair: B. Courtois**, TIMA, Grenoble, France	**THERMAL STRESS IN MICROELECTRONICS PACKAGING: PROBABILISTIC APPROACH**
9:40-10:00	**Coffee**	
10:00-10:20	**Embedded Tutorial** **C. Lasance**, Philips, Eindhoven, The Netherlands **Chair: T. Tarter**, AMD, Sunnyvale, USA	**THERMAL CHARACTERISATION BY COMPACT MODELS: WHERE ARE WE ?**

10:20-12:00	**Session 7** **Chair: T. Tarter**, AMD, Sunnyvale, USA	**THERMAL AND THERMOMECHANICAL CHARACTERISATION**
10:20	**J.M. Bosc[1], P. Dupuy[1], J. Gil[1], J.M. Dorkel[2], G. Sarrabayrouse[2]** [1]Motorola, Toulouse, France [2]LAAS, Toulouse, France	**Thermal characterization: a key element for accelerating stress testing**
10:40	**D. Giusti, G. Verzellesi, G.U. Pignatel** U. of Trento, Italy	**Thermo-mechanical analysis of microstructures for chemoresistive gas sensors**
11:00	**S. Leseduarte[1], S. Marco[1], E. Beyne[2], R. van Hoof[2], A. Marty[3], S. Pinel[3], O. Vendier[4], A. Coello-Vero[4]** [1]U. of Barcelona, Spain [2]IMEC, Leuven, Belgium [3]LAAS, Toulouse, France [4]Alcatel Space Industries, Toulouse, France	**Residual thermo-mechanical stresses in thinned chip assemblies**
11:20	**S. Van Dooren[1], B. Vandevelde[1], E. Beyne[1], F. Christiaens[2], D. Corlatan[2]** [1]IMEC, Leuven, Belgium [2]Alcatel Bell, Antwerpen, Belgium	**Parametric compact models for flip chip assemblies**
11:40	**L. Gleton[1], P. Lybaert[1], B. Dessart[2], D. Petitjean[2], A. Sturbois[2]** [1]Fac Polytech. of Mons, Belgium [2]Alcatel ETCA, Charleroi, Belgium	**Static and dynamic thermal characterization of a 28 J-lead ceramic package-application of the DELPHI methodology**
12:00-13:00	**Lunch**	
13:00-14:20	**Session 8** **Chair: M.N. Sabry**, Mansoura U., Egypt	**MEMS**
13:00	**A. Kruusing, S. Leppävuori, A. Uusimäki, H. Moilanen** U. of Oulu, Finland	**Piezoelectric drive for agitation and pumping of coolant in ltcc multilayer modules**
13:20	**U. Dillner, E. Kessler, J. Müller** IPHT, Jena, Germany	**High sensitivity micromachined heat flux sensor: the problem of heat flow field distortion**

13:40	**J.E. Duarte[1,2], M. Moreno[2], E. Martin-Badosa[2]** [1]TU of Colombia, Colombia, [2]U. of Barcelona, Spain	**Design and characterization of thermally actuated bimetallic membrane**
14:00	**E. Burian[1], T. Lalinsky[1], M. Drzik[2]** [1]Inst. of EE, Bratislava, Slovakia [2]Inst. of Constr. & Archit., Bratislava, Slovakia	**Simulation of thermally exited GaAs micromachined microactuator**
14:20-14:40	**Coffee**	
14:40-15:40	**Session 9** **Chair: J. Parry**, Flomerics, Hampton Court, United Kingdom	**THERMAL ANALYSIS TECHNIQUES**
14:40	**V.Székely[1], A. Pàhi[1], A. Poppe[1], M. Rosental[1], T. Teszéri[1], M. Rencz[2]** [1]TU of Budapest, Hungary [2]MicRed, Budapest, Hungary	**Thermal time constant analysis and implementation in the THERMAN and SUNRED thermal simulation tools**
15:00	**M. Bologna, E. Dallago, G. Venchi** U. of Pavia, Italy	**Thermal analysis of a portable PC**
15:20	**S. Koziel, W. Szczesniak** TU of Gdansk, Poland	**Application of evolutionary algorithms to VLSI circuits partitioning with reduction of thermal interactions between elements**
15:40	**Closing remarks**	

Reservation and Registration

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