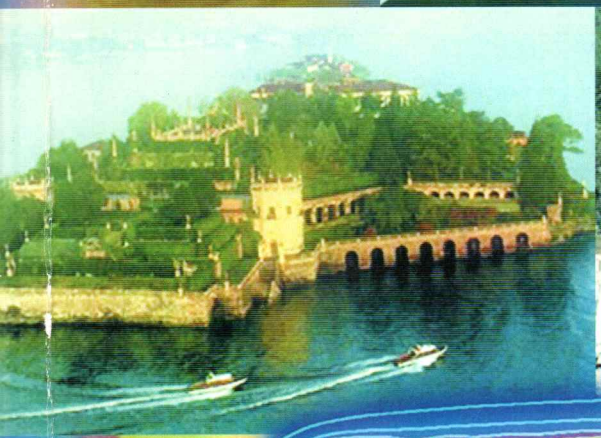
International Workshop on Thermal Investigations of ICs and Systems

11th



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11th International Workshop on

THERMAL INVESTIGATIONS of ICs and Systems

Program Schedule

Wednesday September 28, 2005	
08:00–09:30	**Registration**
09:30–09:40	**Welcome Address** **Chair**: B. Courtois, *TIMA Labs, Grenoble, France*
09:40–10:20	**Invited Talk I: ARE THERMAL PROBLEMS WITH CHIPS SOLVED WITH ARCHITECTURAL ASPECTS ?** T. Nakamura, *U. of Tohoku, Japan* **Chair**: C. Lasance, *Philips Research Laboratories, Eindhoven, The Netherlands*
10:20–12:20	**Session 1: TEMPERATURE AWARE DESIGN** **Chair**: A. Rubio, *UPC, Barcelona, Spain*
	10:20 THERMAL-AWARE DESIGN RULES FOR NANOMETER ICS J-L. Rosselló, S.Bota, M. Rosales, J. Segura, *U. de Les Illes Balears, Palma de Mallorca, Spain* A. Keshavarzi, *Microprocessor Research Labs, Intel, USA*
	10:40 A BLOCK-LEVEL OPTIMIZATION OF COMPREHENSIVE THERMAL-AWARE POWER MANAGEMENT FOR SOC INTEGRATION IN NANO-SCALE CMOS TECHNOLOGY W-M. Chan, H. Chiueh, *National Chiao Tung U., Taiwan*
	11:00 TRANSIENT THERMAL SIMULATION OF A POWER HYBRID MODULE USING AN ANALYTICAL SOLUTION OF THE HEAT EQUATION M. Janicki, A. Napieralski, *TU. of Lodz, Poland* G. De Mey, *Ghent U., Belgium*
	11:20 TWO-DIMENSIONAL TEMPERATURE FIELDS IN ASICS FOR MULTIPLE HEAT SOURCES OF ARBITRARY POWER DISSIPATION DERIVED FROM CONFORMAL MAPPING THEORY A. Augustin, A. Kostka, *Darmstadt U. of Technology, Germany* B. Maj, *Continental Teves AG, Frankfurt, Germany*
	11:40 A NOVEL APPROACH FOR GENERATING DYNAMIC COMPACT MODELS OF THERMAL NETWORKS HAVING LARGE NUMBERS OF POWER SOURCES L. Codecasa, D. D'Amore, P. Maffezzoni, N. Spennagallo, *Politecnico di Milano, Italy*
	12:00 FLEXIBLE PROFILE COMPACT THERMAL MODELS M-N. Sabry, *U. Française d'Egypte, Cairo, Egypt*
12:20	**COFFEE BREAK**
12:40–13:10	**Poster Introductions session I** **Chair**: M. Rencz, *BUTE, Budapest, Hungary*
	12:40 SUPERIOR-ORDER IMPROVED PERFORMANCES CURVATURE-CORRECTED VOLTAGE REFERENCE USING A TEMPERATURE-DEPENDENT CURRENT GENERATOR CIRCUIT P. Cosmin, *Faculty of Electronics, Telecommunications and Information Technology, Bucharest, Romania*
	12:43 LOGARITHMIC CURVATURE-CORRECTED WEAK INVERSION CMOS VOLTAGE REFERENCE WITH IMPROVED PERFORMANCE P. Cosmin, *Faculty of Electronics, Telecommunications and Information Technology, Bucharest, Romania*
	12:46 RELIABILITY STUDY OF POWER RF LDMOS DEVICES UNDER THERMAL STRESS M.A. Belaid, *LEMI, Rouen, France*
	12:49 AN ADAPTIVE-GRAIN THERMAL SIMULATION METHOD TO EVALUATE EFFECTS OF SPATIO-TEMPORAL ANALYSIS GRANULARITY UPON THE THERMAL BEHAVIOR OF VLSIS M. Ito, *Tohoku U., Japan*

	12:52 THE SISSY ELECTRO-THERMAL SIMULATION SYSTEM – BASED ON MODERN SOFTWARE TECHNOLOGIES G. Horváth, A. Poppe, *BUTE, Budapest, Hungary*
	12:55 THEORETICAL INVESTIGATION OF THERMAL FEEDBACK EFFECT IN LOW-POWER CIRCUITS M. Kuuse, *National Semiconductor Estonia, Tallinn, Estonia* M. Loikkanen, *Oulu U., Finland* G. Bognár, *BUTE, Budapest, Hungary*
	12:58 AN APPROACH TO THE ELECTRICAL CHARACTERIZATION OF ANALOG BLOCKS THROUGH THERMAL MEASUREMENTS D. Mateo, J. Altet, E. Aldrete, *UPC, Barcelona, Spain*
	13:01 A NEW METHOD OF THE THERMAL RESISTANCE MEASUREMENTS J. Zarebski, K. Gorecki, *Gdynia Maritime U., Poland*
	13:04 THERMAL ANALYSIS OF MULTI-FINGER AlGaN/GaN HEMTS: COMPARISON BETWEEN FLIP-CHIP AND SUBSTRATE REMOVAL H. Oprins, J. Das, R. Vandersmissen, B. Vandevelde, M. Germain, *IMEC, Leuven, Belgium*
13:10	**LUNCH**
14:40-16:00	**THERMAL STRESS AND THERMAL STRESS FAILURES: PREDICTION AND PREVENTION** **Special session** organized by E. Suhir, *U. of California, Santa Cruz, USA* (invited) Part I: **PREDICTIVE MODELING** **Chair**: A-C. Pliska, *CSEM, Zurich, Switzerland*
	14:40 BONDING SEMICONDUCTOR LASER CHIPS: SUBSTRATE MATERIAL FIGURE-OF-MERIT AND DIE ATTACH LAYER INFLUENCE A-C. Pliska, *CSEM, Zurich, Switzerland*
	15:00 THERMAL AND THERMO-MECHANICAL MODELING OF POLYMER OVERMOLDED ELECTRONICS F. Sarvar, N.J. Teh, D.C. Whalley, D.A. Hutt, P.J. Palmer, *Loughborough U., Leics, UK*
	15:20 ANALYTICAL THERMAL STRESS MODELING IN PHYSICAL-DESIGN-FOR-RELIABILITY OF MICRO- AND OPTO-ELECTRONIC SYSTEMS E. Suhir, *U. of California, Santa Cruz, USA*
	15:40 TRYING TO MINIMIZE THE BONDLINE THERMAL RESISTANCE IN THERMAL INTERFACE MATERIALS WITHOUT EFFECTING RELIABILITY J.A. Emerson, M.J. Rightley, J.A. Galloway, D.F. Rae, *Sandia National laboratories, Albuquerque, USA* N.M. and D.L. Huber, E.J. Cotts, *Binghamton U., Binghamton, USA*
16:00	 **COFFEE BREAK**
16:20-17:20	**Session 2: SENSORS** **Chair**: P. Raad, *Southern Methodist U., Dallas, USA*
	16:20 MICROMACHINED HEAT EXCHANGER FOR A CRYOSURGICAL PROBE W. Zhu, Y. Gianchandani, *U. of Michigan, Ann Arbor, USA* G. Nellis, S. Klein, *U. of Wisconsin-Madison, USA*
	16:40 PROPOSAL OF A NEW STRUCTURE THERMAL VACUUM SENSOR WITH DIODE-THERMISTORS COMBINED WITH A MICRO-AIR-BRIDGE HEATER M. Kimura, *Tohoku-Gakuin U., Japan*
	17:00 DIFFERENTIAL TEMPERATURE SENSORS IN 0.35µm CMOS TECHNOLOGY E. Aldrete, D. Mateo, J. Altet, *UPC, Barcelona, Spain*
17:20-17:50	**Poster Introductions session II** **Chair**: M. Rencz, *BUTE, Budapest, Hungary*
	17:20 IMPROVED 3D-NONLINEAR COMPACT MODELING FOR MULTI CHIPS SYSTEMS W. Habra, P. Tounsi, J-M. Dorkel, *LAAS-CNRS, Toulouse, France*
	17:23 MODEL REDUCTION FOR THERMO-MECHANICAL SIMULATION OF PACKAGES J. Wilde, E. Rudnyi, J. Korvink, E. Zukowski, *U. of Freiburg, IMTEK, Germany*
	17:26 ERROR INDICATOR TO AUTOMATICALLY GENERATE DYNAMIC COMPACT PARAMETRIC THERMAL MODELS E. Rudnyi, G. Korvink, *U. of Freiburg, IMTEK, Germany* L. Feng, *Fudan U., China* M. Salleras, S. Marco, *U. de Barcelona, Spain*

	17:29 INVERSE THERMAL PROBLEM VIA MODEL ORDER REDUCTION T. Bechtold, *U. of Freiburg, IMTEK, Germany*
	17:32 TEMPERATURE GRADIENT ALLEVIATING METHOD FOR ARITHMETIC UNITS R. Egawa, *GSIS Tohoku U., Japan*
	17:35 THERMAL MODELING OF POWER HYBRID MODULES M. Ayadi, *ENIS, Sfax, Tunisia*
	17:38 VALIDATION OF THE DJOSER ANALYTICAL THERMAL SIMULATOR FOR ELECTRONIC POWER DEVICES AND ASSEMBLING STRUCTURES P-E. Bagnoli, F. Stefani, C. Bartoli, *U. of Pisa, Italy* M. Monichino, *Hybritech, Milano, Italy*
	17:41 ELECTRO-THERMAL-MECHANICAL ANALYSIS OF A HIQUAD PACKAGE FOR HIGH CURRENT AND HIGH POWER APPLICATION L. Chen, H. Oprins, B. Vandevelde, *IMEC Leuven, Belgium* G. Brizar, D. Vanderstraeten, E. Blansaer, *AMI Semiconductor Oudenaarde, Belgium*
17:50–18:20	**Vendors session** **Chair**: B. Courtois, *TIMA Labs, Grenoble, France*
18:20–20:00	**Exhibition and Poster Viewing**
19:00–20:00	**COCKTAIL**
Thursday September 29	
08:30–10:10	**THERMAL STRESS AND THERMAL STRESS FAILURES: PREDICTION AND PREVENTION** **Special session** organized by E. Suhir, *U. of California, Santa Cruz, USA* (invited) Part II: **THERMO-MECHANICAL BEHAVIOR AND RELIABILITY OF MATERIALS AND INTERFACES** **Chair**: A. Shakouri, *U. of California, Santa Cruz, USA*
	8:30 ACOUSTIC CHARACTERIZATION OF INTERFACES A. Shakouri, *U. of California, Santa Cruz, USA*
	8:50 EFFECT OF TEMPERATURE ON VIBRATIONS IN PHYSICALLY NONLINEAR PIEZOELECTRIC RODS V. Birman, *U. of Missouri, Rolla, USA* E. Suhir, *U. of California, Santa Cruz, USA*
	9:10 ACCELERATED FAILURE TEST FOR HIGH-T APPLICATIONS OF POWER MOSFET BY POWER CYCLING R. Schacht, B. Michel, *Fraunhofer Institute, Berlin, Germany*
	9:30 EFFECT OF ASSEMBLY STIFFNESS AND SOLDER PROPERTIES ON THERMAL CYCLING ACCELERATION FACTORS R. Darveaux, *Amkor Technologies, Chandler, USA*
	9:50 THERMAL FATIGUE ASSESSMENT OF LEAD-FREE SOLDER JOINTS Q. Yu, *Yokohama National U., Japan*
10:10	 **COFFEE BREAK**
10:30–12:10	**Session 3: THERMAL AND TEMPERATURE MEASUREMENT METHODS** **Chair**: W. Claeys, *U. Bordeaux 1, France*
	10:30 SMOKE AND CFD VISUALIZATION OF THE FLOW AFTER AN EMC SCREEN IN A SUBRACK MODEL R. Antón, H. Jonsson, *Royal Institute of Technology, Stockholm, Sweden* M. Castiella, *Tecnun U. of Navarra, Spain* B. Moshfegh, *U. og Gävle, Sweden*
	10:50 A SCANNING FLUORESCENT PROBE FOR LOCAL TEMPERATURE IMAGING OF MICROELECTRONIC CIRCUITS L. Aigouy, G. Tessier, Y. De Wilde, *ESPCI, Paris, France* M. Mortier, *ENSCP, Paris, France* B. Charlot, *TIMA Labs, Grenoble, France*
	11:10 THERMAL IMAGING OF Si, GaAs AND GaN -BASED DEVICES WITHIN THE MICROTHERM PROJECT S. Pavageau, G. Tessier, *ESPCI, Paris, France*

	11:30 DETERMINATION OF THERMOPHYSICAL PROPERTIES OF Si/SiGe SUPERLATTICES WITH A PUMP-PROBE TECHNIQUE Y. Ezzahri, S. Grauby, S. Dilhaire, J-M. Rampnoux, W. Claeys, *U. Bordeaux 1, France*
	11:50 AN INTEGRATED EXPERIMENTAL AND COMPUTATIONAL SYSTEM FOR THE THERMAL CHARACTERIZATION OF COMPLEX THREE-DIMENSIONAL SUBMICRON ELECTRONIC DEVICES P. Raad, P. Komarov, M. Burzo, *Southern Methodist U., Dallas, USA*
12:30	**LUNCH**
14:00-15:20	**Session 4: THERMAL TRANSIENT TESTING** **Chair**: J. Janssen, *Philips Semiconductors, The Netherlands*
	14:00 TRANSIENT THERMAL ANALYSIS OF POWER LEDS AT PACKAGE & BOARD LEVEL J.H. Yu, *Lumileds Lighting, Best, The Netherlands* G. Farkas, *MicReD, Budapest, Hungary*
	14:20 MECHANISM AND THERMAL EFFECT OF DELAMINATION IN LIGHT-EMITTING DIODE PACKAGES M-W. Shin, J. Hu, L. Yang, *Myong Ji U., Yongin, Korea*
	14:40 STRUCTURE FUNCTION REPRESENTATION OF MULTI-DIRECTIONAL HEAT-FLOWS L. Codecasa, D. D'Amore, P. Maffezzoni, *Politecnico di Milano, Italy*
	15:00 CROSS-VERIFICATION OF THERMAL CHARACTERISATION OF A MICRO-COOLER Z. Kohári, G. Bognár, G. Horváth, E. Kollár, A. Poppe, M. Rencz, V. Székely, *BUTE, Budapest, Hungary*
15:20	 **COFFEE BREAK**
15:40-16:40	**Exhibition and Poster Viewing**
16:40	**Enf of sessions**  17:00 Departure from the Hotel Villa Carlotta, by a private boat to the palace and the gardens of Isola Bella, the most important attraction of Lake Maggiore.  20:00 Typical dinner at the Hotel Milano. The restaurant has the largest and most charming terrace overlooking the most beautiful Italian lake. (Walking distance to and from the hotel Villa Carlotta)
Friday September 30	
09:00-09:40	**Invited Talk II: CARBON NANOTUBES AS THERMAL SENSING ELEMENTS** W.J. Li, *The Chinese University of Hong Kong* **Chair**: V. Székely, *BUTE, Budapest, Hungary*
09:40-10:40	**Session 5: HEAT TRANSFER AND COOLING** **Chair**: L. Codecasa, *Politecnico di Milano, Italy*
	09:40 RAREFIED GAS HEAT TRANSFER BETWEEN A NANOMETRIC TIP AND A SAMPLE P-O. Chapuis, *EM2C-Ecole Centrale Paris, France*
	10:00 THERMIONIC REFRIGERATOR WITH NONPLANAR ELECTRODES AND COMBINED FIELD AND THERMIONIC ELECTRON EMISSION Y-Ch. Gerstenmaier, *Siemens AG, Munich, Germany* G. Wachutka, *Munich U. of Technology, Germany*
	10:20 DROPLET-BASED HOT SPOT COOLING USING TOPLESS DIGITAL MICROFLUIDICS ON A PRINTED CIRCUIT BOARD Ph. Paik, V. Pamula, K. Chakrabarty, *Duke U., USA*
10:40	 **COFFEE BREAK**
11:00-12:40	MICRO TO NANO SCALE THERMAL MEASUREMENTS ON ICS: BENCHMARKING THE UP-TO-DATE METROLOGIES **Special session** organized by *the Research Network "Micro and Nanoscale Heat Transfer" of the CNRS (The French National Center for Scientific Research)* **Chair**: S. Volz, *Ecole Centrale Paris, Châtenay-Malabry, France*

	11:00 INTRODUCTION S. Volz, *Ecole Centrale Paris, Châtenay-Malabry, France*
	11:20 TEMPERATURE VARIATIONS IMAGING BY THERMOREFLECTANCE AND STHM TECHNIQUES S. Grauby, A. Salhi, L. Patino Lopez, S. Dilhaire, W. Claeys, *U. Bordeaux 1, France*
	11:35 QUANTITATIVE THERMOREFLECTANCE IMAGING: CALIBRATION METHOD AND VALIDATION ON A DEDICATED INTEGRATED CIRCUIT G. Tessier, *ESPCI, Paris, France*
	11:50 ULTRA-LOCAL TEMPERATURE MAPPING WITH AN INTRINSIC THERMOCOUPLE S. Volz, *Ecole Centrale Paris, Châtenay-Malabry, France*
	12:05 TEMPERATURE MEASUREMENT OF MICROSYSTEMS BY SCANNING THERMAL MICROSCOPY N. Trannoy, *U. de Reims, France*
	12:20 **DISCUSSION**
12:40	**LUNCH**