

# **MICRONANORELIABILITY 2007**

**1st International CONGRESS  
on Microreliability and Nanoreliability  
in Key Technology Applications**

**Berlin (D), Sept. 2-5, 2007**

## **Programme**

### ORGANIZERS

EUCEMAN European Center for Micro- and Nanoreliability e.V. Berlin  
([www.euceman.com](http://www.euceman.com))

in cooperation with:

MMCB - Micro Materials Center Berlin at  
IZM Fraunhofer Institute for Reliability and Microintegration

Technical organizer

Nanotest Berliner Nanotest und Design GmbH ([www.nanotest.org](http://www.nanotest.org))

**MicroNanoReliability Congress**

**Programme at a Glance**

**Sept. 2, 2007**

Tutorials (Afternoon, all parallel))	Tutorials				
	T1		T3	T4	T5
	T6	T7		T9	

**Sept. 3, 2007**

Early Morning Session	<b>1.1</b>	<b>1.2</b>	<b>1.3</b>	<b>1.4</b>	<b>1.5</b>	<b>1.6</b>
	Micro- and nanomaterials I	Reliability analysis and modelling I	Nanoanalysis		Reliability concepts I	Solder reliability modelling
Late Morning Session	<b>2.1</b>	<b>2.2</b>	<b>2.3</b>	<b>2.4</b>	<b>2.5</b>	<b>2.6</b>
	Micro- and nanomaterials II	Reliability analysis and modelling II	Nano-indentation	Reliability of micro-components and MEMS	Reliability concepts II	Reliability applications I
Opening and Plenary Sessions (Afternoon)	Plenum I					
	Plenum II					
	Plenum III					

**Sept. 4, 2007**

Early Morning Session	<b>3.1</b>	<b>3.2</b>	<b>3.3</b>	<b>3.4</b>	<b>3.5</b>	<b>3.6</b>
	Special Workshop on aging and shelf life of MEMS I	Reliability analysis and modelling III	Optical metrology & deformation analysis	Micro- and nanomaterials III	ESD and failure of electronic components	Reliability applications II
Late Morning Session	<b>4.1</b>	<b>4.2</b>	<b>4.3</b>	<b>4.4</b>	<b>4.5</b>	<b>4.6</b>
	Special Workshop on aging and shelf life of MEMS II	Reliability analysis and modelling IV	Characterization and testing I	Micro- and nanomaterials IV	Reliability concepts III	Reliability applications III
Early Afternoon Session	<b>5.1</b>	<b>5.2</b>	<b>5.3</b>	<b>5.4</b>	<b>5.5</b>	<b>5.6</b>
	Reliability of MEMS I	Solder Joint & Interconnect Reliability I	Characterization and testing II	Micro- and nanomaterials V	Nanoscale strength and reliability I	Reliability applications IV
Afternoon	Poster Discussion (about 40 posters)					
Late Afternoon Session	<b>6.1</b>	<b>6.2</b>	<b>6.3</b>	<b>6.4</b>	<b>6.5</b>	<b>6.6</b>
	Reliability of MEMS II	Solder Joint & Interconnect Reliability II	Characterization and testing III	Micro- and nanomaterials VI	Nanoscale strength and reliability II	Reliability applications V

**Sept. 5, 2007**

Early Morning Session	<b>7.1</b>	<b>7.2</b>	<b>7.3</b>	<b>7.4</b>	<b>7.5</b>	<b>7.6</b>
	Reliability and lifetime estimation	Molecular modelling	Local stress analysis	Crack and fracture	Reliability monitoring & diagnostics	Reliability applications VI
Late Morning Session	<b>8.1</b>	<b>8.2</b>	<b>8.3</b>	<b>8.4</b>	<b>8.5</b>	<b>8.6</b>
	Interdisciplinary reliability aspects	Thermal modelling & characterizat.	Reliability and micro-structure	Adhesion	Reliability - dynamic problems	Reliability applications VII
Plenary Sessions (Afternoon)	Plenum IV					
	Plenum V					

# MicroNanoReliability Congress

**Berlin, Sept. 2-5, 2007**

Courtyard by Marriott Hotel Berlin-Köpenick

**[www.micronanoreliability.com](http://www.micronanoreliability.com)**

## Programme

Aug. 30, 2007

### Time schedule

#### Sunday, Sept. 2

14:00 - 17:30      7 tutorials parallel

#### Monday, Sept. 3

09:00 – 12:00      6 parallel sessions

13:00 – 18:00      Opening plenary session

Parallel: Poster exhibition and Exhibition

#### Tuesday, Sept. 4

08:30 – 12:15      5 parallel sessions

1 Special workshop

13:30 – 18:00      6 parallel sessions

Parallel: Poster exhibition and Exhibition

#### Wednesday, Sept. 5

08:30 – 12:00      6 parallel sessions

13:00 – 16:00      Plenary session

Parallel: Poster exhibition and Exhibition

**Sept. 2, 2007**

12:00-14:00

Check-in

14:00

T1	T3	T4	T5	T6
			T7	T9

15:30-16:00

Coffee break

16:00

T1	T3	T4	T5	T6
			T7	T9

17:30

Closure

**Sept. 3, 2007**

08:00-09:00

Check-in

**Early Morning Session**

Chairmen

09:00

09:25

09:45

10:05

10:25 - 10:45

	1.1	1.2	1.3	1.4	1.5	1.6
	<b>Micro- and nanomaterials I</b>	<b>Reliability analysis and modelling I</b>	<b>Nanoanalysis</b>		<b>Reliability concepts I</b>	<b>Solder reliability modelling</b>
	Gerberich / Fecht	Dommann / Ernst	Weiss / N.N.		Suhir / Jacob	Turbini / Wiese
K1	Fecht	Rzepka	Villain		Aifantis	Dudek
1	Murafa	de Vreugd	Stojanovic		Wilde	Wiese
2	Miura	Feng	Ranganathan		Korobeynikov	Cugnoni
3	Schulze	Falat	Mertin			Bennemann

Coffee break

**Late Morning Session**

Chairmen

10:45

11:10

11:30

11:50

11:50 - 13:00

	2.1	2.2	2.3	2.4	2.5	2.6
	<b>Micro- and nanomaterials II</b>	<b>Reliability analysis and modelling II</b>	<b>Nano-indentation</b>	<b>Reliability of micro-components and MEMS</b>	<b>Reliability concepts II</b>	<b>Reliability applications I</b>
	Morris / Müller	Zhang / Felba	Goldstein / Wittler	Mertin / Zimprich	Aifantis / Mazza	Zschech / Lou
K2	Müller, W.	Auersperg	Kozuki	Jacob	Kanert	Ito
4	Tan	Dowhan	Nelle	Ferraris	Doireau	Wang/Lou
5	Geißler	Ebert	Vecchione	Wiemer	Scherzer	Mohtaram
5	Pugno					

Lunch break

**Plenum I**

13:00

13:10

13:30

13:35

14:05

14:30

14:55 - 15:20

**Plenum II**

15:20

15:45

16:10

16:35

17:00 - 17:25

**Plenum III**

17:25

17:50

18:15

18:40

	Michel / Zhang / Kishimoto / Pecht
P	Michel
P	Buller
	EUCEMAN Award presentation
	Michel / Heinze
P1	Geßner
P2	Zhang
P3	Dauskardt
	Coffee break
	Kishimoto / Meyyappan
P4	Pecht
P5	Foucher
P6	Bailey
P7	Pryputniewicz
	Coffee break
	Pufall / Aschenbrenner
P8	McDonough/Geer
P9	Yu
P10	Wunderle/Michel
	Closure

Plenary lecture

25'
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Session key-note

25'
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Session paper

20'
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Special workshop

30'
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Poster

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Chairmen

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Sept. 4, 2007

		3.1	3.2	3.3	3.4	3.5	3.6
<b>Early Morning Session</b>		<b>Special Workshop on aging and shelf life of MEMS I</b>	<b>Reliability analysis and modelling III</b>	<b>Optical metrology &amp; deformation analysis</b>	<b>Micro- and nanomaterials III</b>	<b>ESD and failure of electronic components</b>	<b>Reliability applications II</b>
Chairmen		Ashley / Winkler	Rang / Brunschwiler	Pryputniewicz / Osten	Pugno / Scherzer	Saka / Gieser	Wondrak / Vormoor
08:30	K3	Attention: times differ from the general scheme	Hauck	Osten	Carpinteri, Pugno	Gieser	Kohl
08:55	6		Schacht	Keller	Khromov	Ndip	Vormoor (KN)
09:15	7	Mönig/Thompson (8:40)	Kaulfersch	Walter	Boeffel	Kusnezoff	Böhme
09:35	8	Meyyappan (9:10)	Zacharopoulos/Pa.	Schneider, D.	Gesang	Schimpf	Shaporin
09:55	9	Dugger (9:40)		Barabanenkov	Benfdila	Suñé	Middend./Keller

10:15 - 10:45 **Coffee break**

		4.1	4.2	4.3	4.4	4.5	4.6
<b>Late Morning Session</b>		<b>Special Workshop on aging and shelf life of MEMS II</b>	<b>Reliability analysis and modelling IV</b>	<b>Characterization and testing I</b>	<b>Micro- and nanomaterials IV</b>	<b>Reliability concepts III</b>	<b>Reliability applications III</b>
Chairmen		Ashley / Kranz	Hauck / van Driel	Barbosa / Schneider, D.	Uhlig / N.N.	Dudek / Wilde	Georgakos / Schwaiger
10:45	K4	times differ:	van der Sluis	Ikehara	Morris	Tilgner	Farley
11:10	10	Ready (10:45)	Brocke	Striegler	Lang, Dual	Ghisi	Coulombier
11:30	11	Perdu (11:15)	Schindler	Li	Auerswald	Müller, W.	Drumea
11:50	12	Hu (11:45)	Ranatowski	Tabanyukhova	Bertholet	Biesheuvel	Shamshirsaz

12:10 - 13:30 **Lunch break**

		5.1	5.2	5.3	5.4	5.5	5.6
<b>Early Afternoon Session</b>		<b>Reliability of MEMS I</b>	<b>Solder Joint &amp; Interconnect Reliability I</b>	<b>Characterization and testing II</b>	<b>Micro- and nanomaterials V</b>	<b>Nanoscale strength and reliability I</b>	<b>Reliability applications IV</b>
Chairmen		Bahr / Otto	Svasta / Walter	Katz / Getsov	Werner / Petzold	Keller / Morozov	Foucher / Mariani
13:30	K5	Lavu	Zimprich	Mazza	Schwaiger	Gerberich	Obreja
13:55	13	Souchon	Nieland	Zschenderlein	Kahle	Deromelaere	Goroll
14:15	14	Gaspar	Röllig	Vogel, D.	Yasuoka	Eremeev	Rangu
14:35	15	Meiß	Khatibi	Wolf, J.	Kämpfe, B.	Kozhushko	Zhuravliov
14:55	16		Dresbach	Hanke		Petzold	Aresu

15:15 - 15:45 **Coffee break**

15:45-16:15 **Poster Discussion (about 35 posters)**

		6.1	6.2	6.3	6.4	6.5	6.6
<b>Late Afternoon Session</b>		<b>Reliability of MEMS II</b>	<b>Solder Joint &amp; Interconnect Reliability II</b>	<b>Characterization and testing III</b>	<b>Micro- and nanomaterials VI</b>	<b>Nanoscale strength and reliability II</b>	<b>Reliability applications V</b>
Chairmen		Meyendorf / Wiemer	Kanert / Auersperg	Villain / Ebert	Desmulliez / Albaut	Grimm / Shirangi	Berka / Middendorf
16:15	K6	van Driel	Huang	Barbosa	Töpper	Turbini	Georgakos
16:40	17	Hirsch	Meier	Simonov	Gitis	Flaemig	Kornev
17:00	18	Uruska	Smorodin	Matkowski	Kübel	Getsov	Omiya
17:20	19	Koglin	Dreßler	Niklas	Roth	Rudraraju/Morris	Berka

17:40/18:00

**Closure**

**Congress banquet cruise (incl. award presentations)**

**Sept. 5, 2007**

		<b>7.1</b>	<b>7.2</b>	<b>7.3</b>	<b>7.4</b>	<b>7.5</b>	<b>7.6</b>
<b>Early Morning Session</b>		<b>Reliability and lifetime estimation</b>	<b>Molecular modelling</b>	<b>Local stress analysis</b>	<b>Crack and fracture</b>	<b>Reliability monitoring &amp; diagnostics</b>	<b>Reliability applications VI</b>
Chairmen		Pecht / Schuch	Wunderle / Heino	Geer / Vogel	Doireau / Petzold	Suhir / Nuffer	Sedmak / Walter
<b>08:30</b>	K7	Pufall	Yuan	Sabaté	CambruZZi	Rouet, Foucher	Sedmak
<b>08:55</b>	20	Wittler	Dermitzaki	Vermeulen	Alush/Katz	Bochow-Ness	Hertl
<b>09:15</b>	21	Sommer	Capková	Altmann	Bagdahn	Yu, X.-L.	Middendorf/Grie.
<b>09:35</b>	22	Nowack	Eisenberg	Lempidaki	Badri Ghavifekr	Urbanski	Kalaitzidis/Zach.

**09:55 - 10:30** *Coffee break*

		<b>8.1</b>	<b>8.2</b>	<b>8.3</b>	<b>8.4</b>	<b>8.5</b>	<b>8.6</b>
<b>Late Morning Session</b>		<b>Interdisciplinary reliability aspects</b>	<b>Thermal modelling &amp; characterizat.</b>	<b>Reliability and micro-structure</b>	<b>Adhesion</b>	<b>Reliability - dynamic problems</b>	<b>Reliability applications VII</b>
Chairmen		Fiedler / Gitis	Schacht / Sommer	Yu / Sabaté	Miura / Alsem	Albrecht / Rümmler	Kohl / Omiya
<b>10:30</b>	K8	Wolf	Brunschwiler	Goldstein	Caers	Suhir	Maire
<b>10:55</b>	23	Bajpai	Heino	Müller, M.	Bahr	Rümmler	Drumea
<b>11:15</b>	24	Bechmann	May	Okolo	Jansen	Nuffer	Kämpfe, A.
<b>11:35</b>	25	Fiedler		Corradi	Ocana		Klein

**11:55 - 13:00** *Lunch break*

<b>Plenum IV</b>		Liu / Bachmann
<b>13:00</b>	P11	<b>Moody</b>
<b>13:25</b>	P12	<b>Zschech</b>
<b>13:50</b>	P13	<b>Saka</b>

**14:15 - 14:20**

<b>Plenum V</b>		Rzepka / Michel
<b>14:20</b>	P14	<b>Albrecht</b>
<b>14:45</b>	P15	<b>Liu</b>
<b>15:10</b>	P16	<b>Wondrak</b>
<b>15:35</b>	P17	<b>Alsem</b>

**16:00** *Closure*

<b>POSTER</b>					
P01: Bauer	P08: Hecht	P15: Krause	P22: Noack	P29: Rudraraju	P36: Specht
P02: Bombach	P09:	P16: Kreyßig	P23: Olszewski	P30: Schischka	P37: Takao
P03: Brämer	P10: Heuer	P17: Lee	P24: Ortner	P31: Schindler-Saefkow	
P04: Faust	P11:	P18:	P25: Radojevic	P32: Schnitzer	P38: Wilkinson
P05: Geissler	P12: Knoll	P19: Luczak	P26:	P33: Seiler	P39: Wittler
P06: Gollhardt	P13:	P20: May	P27: Randman	P34:	P40:Zschenderlein
P07: Gerdes	P14: Köhler	P21: Michel	P28: Rögner	P35: Sklyar	

**Sunday, Sept. 2, 14:00 – 17:30, Tutorials**

**T1: Thermal management and reliability -  
Design, technology, verification**

T1 Organizer: B. Wunderle et al., Fraunhofer IZM Berlin, Germany

**T3: Developments and trends in  
micro and nano testing methods**

T3 Organizer: H. Walter, AMIC GmbH, Berlin, Germany et al.

**T4: Advanced CMOS -  
Technology, materials, characterization**

T4 Organizer: E. Zschech, AMD Dresden

**T5: Failure modes and effects of failures in MEMS**

T5 Organizer: M. Desmulliez et al., Heriot-Watt University, Edinburgh, U.K.

**T6: Reliability issues of electrically conductive adhesives**

T6 Organizer: J. Morris, Portland State University, USA

**T7: Thermal stress failures in micro-electronics:  
Prediction and prevention**

T7 Organizer: E. Suhir, University of California, Santa Cruz, CA, and University of Maryland, College Park, MD, USA

**T9: Design of Experiments (DoE) for reliability and  
optimization**

T9 Organizer: J. Auersperg, Fraunhofer IZM Chemnitz, AMIC GmbH Berlin, Germany, et al.

## Monday, Sept. 3, Opening Plenary Session

Chairmen: B. Michel (*Fraunhofer IZM, MMCB, Berlin and Chemnitz, Germany*)  
G.Q. Zhang (*Delft University of Technology, The Netherlands*)  
K. Kishimoto (*Tokyo Institute of Technology, Japan*)  
M. Pecht (*University of Maryland, CALCE, College Park, USA*)

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13:00 Michel, B.  
*Fraunhofer IZM Berlin*  
**Congress opening**

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13:10 Buller, U.  
*Vice President, Fraunhofer Society, Munich*  
**Opening address**

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13:30 Michel, B., Winkler, T.  
*European Center for Micro- and Nanoreliability  
EUCEMAN*  
**Presentation of EUCEMAN Reliability Awards**

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Chairmen: B. Michel (*Fraunhofer IZM, MMCB, Berlin and Chemnitz, Germany*)  
L. Heinze (*VDI/VDE-IT, Berlin, Germany*)

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13:35 Geßner, T.  
*Chemnitz University of Technology / Fraunhofer IZM,  
Chemnitz, Germany*  
**Smart systems integration and reliability**

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14:05 Zhang, G.Q.<sup>1,2</sup>, van Driel, W.D.<sup>1,2</sup>, Yuan, C.<sup>2</sup>  
<sup>1</sup> *NXP Semiconductors, Nijmegen*  
<sup>2</sup> *Delft University of Technology, The Netherlands*  
**The impact of materials on nanoelectronics**

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14:30 Dauskardt, R.H.  
*Stanford University, Stanford, USA*  
**Fracture and reliability in Cu/low-k interconnect  
structures: Role of process variables and packaging**

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14.55 – 15.20 Coffee break

## Monday, Sept. 3, Plenary Session II

Chairmen: K. Kishimoto (*Tokyo Institute of Technology, Japan*)  
M. Meyyappan (*Center for Nanotechnology, NASA Ames Research Center, Moffett Field, USA*)

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15:20 Pecht, M.  
*CALCE, University of Maryland, College Park, USA*  
**New methods to predict reliability of electronics**

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15:45 Foucher, B.  
*EADS Innovation Works, Suresnes, France*  
**The reliability issues of electronics in aeronautics**

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16:10 Bailey, C.  
*University of Greenwich, London, U.K.*  
**Multi-physics analysis as a key enabler for reliability of 3D micro-engineered products**

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16:35 Pryputniewicz, R.J., Pryputniewicz, E.J.  
*Worcester Polytechnic Institute, USA*  
**Operational reliability of a photonic MEMS system**

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17.00 – 17.25 Coffee break

## Monday, Sept. 3, Plenary Session III

Chairmen: R. Pufall (*Infineon Technologies AG, Neubiberg, Germany*)  
R. Aschenbrenner (*Fraunhofer IZM, Berlin, Germany*)

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17:25 McDonough, C., Geer, R.E.  
*Nanotech Albany, USA*  
**High resolution strain analysis with nanoRaman spectroscopy**

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17:50 Yu, S.-W., Yu, L., Feng, X.-Q.  
*Tsinghua University, Beijing, China*  
**Effects of fatigue and damage on the hysteresis loops of ferroelectric ceramics**

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18:15 Wunderle, B., Michel, B.  
*Fraunhofer IZM, Micro Materials Center, Berlin*  
**Progressing from micro- to nanoreliability in system integration**

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18.40 Closure

## Wednesday, Sept. 5, Plenary Session IV

Chairmen: J. Liu (*Chalmers University of Technology, Gothenburg, Sweden, and Shanghai University, SMIT Center, China*)  
G. Bachmann (*VDI-Technologiezentrum, Düsseldorf, Germany*)

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13:00 Moody, N.R.<sup>1</sup>, Kennedy, M. S.<sup>2</sup>, Talin, A.A.<sup>1</sup>, Bahr, D.F.<sup>2</sup>,  
Reedy, E.D., Jr.<sup>3</sup>  
<sup>1</sup> *Sandia National Laboratories, Livermore,*  
<sup>2</sup> *Washington State University, Pullman*  
<sup>3</sup> *Sandia National Laboratories, Albuquerque, USA*  
**Patterning interfaces for reliability of nanoscale thin film devices**

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13:25 Zschech, E., Meyer, M.A., Vairagar, A.V., Zienert, I., Langer, E.,  
Hecker, M., Geisler, H., Engelmann, H.J.  
*AMD Saxony LLC & Co. KG, Dresden, Germany*  
**Metal interconnect micro- and nanostructure and electromigration-induced damage mechanisms**

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13:50 Saka, M.<sup>1</sup>, Kohara, T.<sup>1</sup>, Hasegawa, T.<sup>1</sup>, Yamashita, M.<sup>2</sup>  
<sup>1</sup> *Tohoku University, Sendai*  
<sup>2</sup> *Fuji Electric Advanced Technology Co. Ltd., Tokyo, Japan*  
**A simple method for testing electromigration resistance of solders**

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14.15 – 14.20 Short break

## Wednesday, Sept. 5, Plenary Session V

Chairmen: S. Rzepka (*Qimonda Dresden, Germany*)  
B. Michel (*Fraunhofer IZM, Berlin, Germany*)

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14:20 Albrecht, H.-J.  
*Siemens AG, Berlin, Germany*  
**Technical reliability of miniaturized lead-free solder interconnects**

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14:45 Liu, J.  
*Chalmers University of Technology, Gothenburg, Sweden  
and Shanghai University, SMIT Center, China*  
**Development and characterization of nano-solders, nano-conductive adhesives, nano-thermal interface materials, and nano-carbon tube based interconnects and cooling devices**

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15:10 Wondrak, W., Senske, W.  
*DaimlerChrysler AG, Böblingen, Germany*  
**Future reliability concepts for automotive electronics**

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15:35 Alsem, D.H.<sup>1</sup>, Boyce, B.L.<sup>2</sup>, Stach, E.A.<sup>3</sup>, Ritchie, R.O.<sup>1,4</sup>  
<sup>1</sup> *Lawrence Berkeley National Laboratory, Berkeley*  
<sup>2</sup> *Sandia National Laboratory, Albuquerque*  
<sup>3</sup> *Purdue University, West Lafayette*  
<sup>4</sup> *University of California, Berkeley, USA*  
**High-cycle fatigue of micron-scale Silicon structural films for MEMS applications**

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16.00 Closure

**Monday, Sept. 3, 9:00 - 10:25, Early Morning Session /1.1/,  
Micro- and Nanomaterials I**

Chairmen: W.W. Gerberich (*University of Minnesota, Minneapolis, USA*)  
H. Fecht (*University of Ulm / FZ Karlsruhe, Germany*)

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10:45 Fecht, H.  
Key-note *University of Ulm / Forschungszentrum Karlsruhe,  
Germany*  
**Properties and applications of nanocrystalline CVD-  
grown diamond, MicroDevice fabrication and  
microreliability**

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11:10 Murafa, N.<sup>1</sup>, Berka, L.<sup>2</sup>  
<sup>1</sup> *Institute of Inorganic Chemistry, Prague*  
<sup>2</sup> *Czech Technical University in Prague, Czech Republic*  
**Brittle properties of DLC layers deposited on the Si  
plate**

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11:30 Miura, H., Suzuki, K., Samukawa, S.  
*Tohoku University, Sendai, Japan*  
**Effect of oxygen deficiency and carbon interstitials  
on local band gap of Hafnium oxide thin films for  
nano-scale transistors**

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11:50 Schulze, K., Schulz, S.E., Geßner, T.  
*Chemnitz University of Technology, Germany*  
**Thermal behavior of interconnect systems: A  
comparison of low-k, air gap and SiO<sub>2</sub> integration**

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10.25 – 10.45 Coffee break

**Monday, Sept. 3, 9:00 - 10:25, Early Morning Session /1.2/,  
Reliability analysis and modelling I**

Chairmen: A. Dommann (*CSEM Neuchatel, Switzerland*)  
L.J. Ernst (*Delft University of Technology, The Netherlands*)

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09:00 Rzepka, S.  
*Key-note* *Qimonda Dresden GmbH & Co. OHG, Dresden, Germany*  
**The effect of visco-elasticity on the results of  
lifetime prediction of BGA modules under thermal  
cycle loads by FEM analysis**

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09:25 de Vreugd, J., Jansen, K.M.B., Bohm, C.  
*Delft University of Technology, The Netherlands*  
**Modeling the effect of physical aging on viscoelastic  
properties of a molding compound**

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09:45 Feng, W., Frémont, H., Verdier, F., Plano, B.  
*University Bordeaux I, IMS Laboratory, ENSEIRB, France*  
**Simple analytical model for thermally-induced  
warping of PoP**

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10:05 Fałat, T., Friedel, K.  
*Wrocław University of Technology, Poland*  
**TSV constraints related to temperature excursion,  
pressure during moulding and materials used**

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10.25 – 10.45 Coffee break

**Monday, Sept. 3, 9:00 - 10:25, Early Morning Session /1.3/,  
Nanoanalysis**

Chairmen: B. Weiss (*University Vienna, Austria*)  
K.-J. Wolter (*Institute for Problems in Mechanics, Moscow, Russia*)

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09:00 Villain, J., Corradi, U., Weippert, C., Meeh, M.  
*Key-note* University of Applied Sciences Augsburg, Germany  
**Nano hardness of differently oriented Tin crystals in  
small solder joints**

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09:25 Stojanovic, D.<sup>1</sup>, Radojevic, V.<sup>1</sup>, Tang, C.Y.<sup>2</sup>, Chen, D.Z.<sup>2</sup>,  
Uskokovic, P.S.<sup>1</sup>, Aleksic, R.<sup>1</sup>  
<sup>1</sup> *University of Belgrade, Belgrade, Serbia*  
<sup>2</sup> *Hong Kong Polytechnic University, Hung Hom,  
Kowloon, Hong Kong, China*  
**Nanomechanical properties of silane coated silica-  
poly(methylmethacrylate) nanocomposites**

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09:45 Ranganathan, N.<sup>1</sup>, Vasques, B.<sup>1</sup>, Joly, D.<sup>1</sup>, Bouchou, A.<sup>1</sup>,  
Leroy, R.<sup>1</sup>, Beake, B.<sup>2</sup>  
<sup>1</sup> *University of Tours, LMR, CEROC, France*  
<sup>2</sup> *Micro Materials, Wrexham, U.K.*  
**A study of the nanoimpact resistance of hard  
coatings**

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10:05 Mertin, W.<sup>1</sup>, Katzer, K.-D.<sup>1</sup>, Lochthofen, A.<sup>1</sup>, Bacher, G.<sup>1</sup>,  
Jaeger, K.<sup>2</sup>, Streubel, K.<sup>2</sup>, Furitsch, M.<sup>2</sup>, Brüderl, G.<sup>2</sup>, Hahn, B.<sup>2</sup>,  
Strauss, U.<sup>2</sup>, Härle, V.<sup>2</sup>  
<sup>1</sup> *University of Duisburg-Essen, Duisburg*  
<sup>2</sup> *OSRAM Opto Semiconductors, Regensburg, Germany*  
**Nanoanalysis of optoelectronic emitters with  
electrical scanning force microscopy**

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10.25 – 10.45 Coffee break

**Monday, Sept. 3, 9:00 - 10:25, Early Morning Session /1.5/,  
Reliability concepts I**

Chairmen: E. Suhir (*University of California, Santa Cruz, USA*)  
P. Jacob (*EMPA, Dübendorf, Switzerland*)

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09:00 Aifantis, E.C.  
*Key-note, invited Aristotle University of Thessaloniki, Greece*  
**Exploring the micro-nano mechanics transition:  
Theory and applications**

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09:25 Wilde, J., Fischer, S.  
*University of Freiburg, IMTEK, Germany*  
**Modelling of polymer-based nano-composite  
materials for the reliability prediction of  
microsystems**

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09:45 Korobeynikov, S.N.<sup>1</sup>, Babichev, A.V.<sup>2</sup>  
<sup>1</sup> *Lavrentyev Institute of Hydrodynamics, Novosibirsk*  
<sup>2</sup> *Institute of Geology and Mineralogy, Novosibirsk,  
Russia*  
**Stability criteria for processes of nanostructures  
deformation**

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10.05 – 10.45 Coffee break

**Monday, Sept. 3, 9:00 - 10:25, Early Morning Session /1.6/,  
Solder reliability modelling**

Chairmen: L. Turbini (*RIM Research In Motion, Waterloo, Canada*)  
S. Wiese (*Dresden University of Technology, Germany*)

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09:00 Dudek, R., Faust, W., Döring, R., Michel, B.  
*Key-note* Fraunhofer IZM, Micro Materials Center, Chemnitz,  
Germany  
**In-situ microscopic studies on microstructural  
degradation and FE analyses for miniaturized SAC  
solder joints under thermal test- and field cycling**

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09:25 Wiese, S., Röllig, M., Müller, M., Wolter, K.-J.  
*Dresden University of Technology, Germany*  
**The effect of size and composition on the creep of  
lead-free solders**

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09:45 Cugnoni, J.<sup>1</sup>, Botsis, J.<sup>1</sup>, Janczak-Rusch, J.<sup>2</sup>  
<sup>1</sup> LMAF/EPFL, Lausanne  
<sup>2</sup> EMPA, Corrosion and Materials Integrity, Dübendorf,  
Switzerland  
**Constraining & size effects on the tensile and shear  
elasto-plastic behavior of lead free solder joints**

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10:05 Bennemann, S.<sup>1</sup>, Altmann, F.<sup>1</sup>, Graff, A.<sup>1</sup>, Schischka, J.<sup>1</sup>,  
Petzold, M.<sup>1</sup>, Theuss, H.<sup>2</sup>, Dangelmaier, J.<sup>2</sup>, Pressel, K.<sup>2</sup>  
<sup>1</sup> Fraunhofer IWMH, Halle/S.  
<sup>2</sup> Infineon Technologies AG, Regensburg, Germany  
**High resolution investigation of intermetallic  
formation and nano-reliability of SnAg2.5Cu0.7  
solder comparing a flip chip- and flip chip in  
package application**

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10.25 – 10.45 Coffee break

**Monday, Sept. 3, 10:45 - 11:50, Late Morning Session /2.1/,  
Micro- and Nanomaterials II**

Chairmen: J.E. Morris (*Portland State University, USA*)  
W. Müller (*Technical University of Berlin, Germany*)

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10:45 Müller, W.

*Key-note, invited* *Technical University of Berlin, Germany*

**Changes in the microstructure of materials and its  
impact on reliability - experiments and modelling**

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11:10 Tan, C.M.

*Key-note* *Nanyang Technological University, Singapore*

**Physics and modelling of electromigration for  
Cu interconnects**

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11:35 Geißler, U.<sup>1</sup>, Schneider-Ramelow, M.<sup>2</sup>, Reichl, H.<sup>1</sup>

<sup>1</sup> *Technical University of Berlin*

<sup>2</sup> *Fraunhofer IZM, Berlin, Germany*

**Micro-nanostructural investigations of AISi1  
bondcontacts**

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11:55 Pugno, N.

*Politecnico di Torino, Italy*

**Macroscopic invisible cables**

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12.15 – 13.00 Lunch break

**Monday, Sept. 3, 10:45 - 11:50, Late Morning Session /2.2/,  
Reliability analysis and modelling II**

Chairmen: G.Q. Zhang (*NXP Semiconductors, Nijmegen, The Netherlands*)  
J. Felba, (*Wroclaw University of Technology, Poland*)

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10:45 Auersperg, J.<sup>1,2</sup>, Shirangi, M.H.<sup>3,1</sup>, Michel, B.<sup>1</sup>

Key-note

<sup>1</sup> *Fraunhofer IZM, Micro Materials Center, Berlin*

<sup>2</sup> *AMIC Angewandte Micro-Messtechnik GmbH, Berlin*

<sup>3</sup> *Robert Bosch GmbH, Reutlingen, Germany*

**DOE and robust design of electronics devices in  
terms of fracture, delamination and thermo-  
mechanical fatigue**

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11:10 Dowhan, L.<sup>1</sup>, Wymyslawski, A.<sup>1</sup>, Dudek, R.<sup>2</sup>

<sup>1</sup> *Wroclaw University of Technology, Poland*

<sup>2</sup> *Fraunhofer IZM, Micro Materials Center, Chemnitz,  
Germany*

**Multi-objective decision support system in  
numerical reliability optimization of modern  
electronic packaging**

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11:30 Ebert, M., Bagdahn, J.

*Fraunhofer IWMH, Halle/S., Germany*

**Numerical reliability assessment of brittle MEMS  
structures based on experiments, size effect theory  
and probabilistic sampling**

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11.50 – 13.00 Lunch break

**Monday, Sept. 3, 10:45 - 11:50, Late Morning Session /2.3/,  
Nanointendation**

Chairmen: O. Wittler (*Fraunhofer IZM, MMCB, Berlin, Germany*)  
R.V. Goldstein (*Institute for Problems in Mechanics, Moscow, Russia*)

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10:45 Kozuki, K.<sup>1</sup>, Omiya, M.<sup>2</sup>, Kishimoto, K.<sup>1</sup>  
Key-note <sup>1</sup> *Tokyo Institute of Technology*  
<sup>2</sup> *Keio University, Yokohama, Japan*

**Delamination behavior of hard film on soft substrate  
during nano- and micro-indentation**

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11:10 Nelle, P.<sup>1</sup>, Schneegans, M.<sup>1</sup>, Stecher, M.<sup>1</sup>, Lilleodden, E.<sup>2</sup>  
<sup>1</sup> *Infineon Technologies AG, Neubiberg*  
<sup>2</sup> *The GKSS Research Center, Geesthacht, Germany*

**Needle imprints and nanoindentation on pads over  
active area**

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11:30 Vecchione, N., Balint, D.S., Wasmer, K.\*, Nikbin, K.M.  
*Imperial College, London, U.K.*  
*\*EMPA, Thun, Switzerland*

**Characterisation of EB-PVD Zirconia by  
nanoindentation**

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11.50 – 13.00 Lunch break

**Monday, Sept. 3, 10:45 - 11:50, Late Morning Session /2.4/,  
Reliability of microcomponents and MEMS**

Chairmen: W. Mertin (*University of Duisburg-Essen, Germany*)  
P. Zimprich (*University of Vienna, Austria*)

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10:45 Jacob, P.

*Key-note, invited* EMPA, Materials Science & Technology, Dübendorf,  
Switzerland

**Polysilicon extensions and etching residues as a  
reliability risk**

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11:10 Ferraris, E.<sup>1</sup>, Pagano, C.<sup>2</sup>, Zerbini, S.<sup>3</sup>, Fassi, I.<sup>2</sup>, Reynaerts, D.<sup>1</sup>

<sup>1</sup> *Katholieke Universiteit Leuven, Belgium*

<sup>2</sup> *National Research Council (CNR-ITIA), Milano*

<sup>3</sup> *STMicroelectronics, Cornaredo, Italy*

**Development of a multi body based 1 DoF rotary  
MEMS**

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11:30 Wiemer, M.<sup>1</sup>, Frömel, J.<sup>1</sup>, Bagdahn, J.<sup>2</sup>, Knechtel, R.<sup>3</sup>

<sup>1</sup> *Fraunhofer IZM, Chemnitz*

<sup>2</sup> *Fraunhofer IWMH, Halle/S.*

<sup>3</sup> *X-Fab Semiconductor Foundries AG, Erfurt, Germany*

**Waferbond technology and quality assessment**

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11.50 – 13.00 Lunch break

**Monday, Sept. 3, 10:45 - 11:50, Late Morning Session /2.5/,  
Reliability concepts II**

Chairmen: E.C. Aifantis (*Aristotle University of Thessaloniki, Greece*)  
E. Mazza (*ETH Zürich, Switzerland*)

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10:45 Kanert, W., Pufall, R.  
*Key-note Infineon Technologies AG, Neubiberg, Germany*  
**Physics of failure and qualification methods for  
semiconductor components in harsh environments**

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11:10 Doireau, L.<sup>1</sup>, Foucher, B.<sup>2</sup>  
<sup>1</sup> *EDF - R&D, Moret sur Loing,*  
<sup>2</sup> *EADS Innovation Works, Suresnes, France*  
**Future and emerging technologies: how to fulfill the  
requirements of industrials who aim at using robust  
and long-term reliable electronic equipments**

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11:30 Scherzer, M.  
*TU Bergakademie Freiberg, Germany*  
**About strength criteria of piezoelectric interface  
corner configurations**

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11.50 – 13.00 Lunch break

**Monday, Sept. 3, 10:45 - 11:50, Late Morning Session /2.6/,  
Reliability applications I**

Chairmen: E. Zschech (*AMD Saxony, Dresden, Germany*)  
W.H. Lou (*Beijing Institute of Technology, China*)

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10:45 Ito, H., Suzuki, K., Miura, H.  
*Key-note* *Tohoku University, Sendai, Japan*  
**Stress-induced anisotropic diffusion of component  
atoms in Ni-base superalloy during creep damage**

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11:10 Wang, Y.-Q., Lou, W.-Z., Fan, N.-J., Hao, J.-W.  
*Beijing Institute of Technology, Beijing, China*  
**Study on fault diagnostic strategy of intelligence  
magnetic detection microsystem**

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11:30 Mohtaram, N.K.<sup>1</sup>, Goharpey, F.<sup>2</sup>  
<sup>1</sup> *Iran Polymer and Petrochemical Institute, Tehran*  
<sup>2</sup> *Amirkabir University of Technology (Tehran  
Polytechnic), Tehran, Iran*  
**Study the effect of Montmorillonite on the  
crystallization of Nylon-6/Clay nanocomposites  
synthesized by in-situ polymerization**

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11.50 – 13.00 Lunch break

## Special Workshop on Aging and Shelf Life of NANO/MEMS Technology

### A Special Workshop will be held on 4 September 2007, parallel to the Early and Late Morning sessions of the MicroNanoReliability Congress.

Applications for NANO/MEMS technology and devices continue to expand as the materials and fabrication technology advances. But device requirements for system integration require a careful look at the technology issues that limit reliability or lifetime in general. But in addition to the operational changes in material or device performance many applications require stability over extended periods in a non-operational state during storage for up to years at a time. As a result the effects of material aging, stress, environmental influences, mechanical distortions, contamination and other changes possibly enhanced by small scale at the nanometer level and molecular or quantum effects poise issues the need to be addressed. Both modeling and experimental tools may provide insights into the predicted changes in structures or their performance. Likewise it may be possible to design materials and devices to be more robust to long term aging and shelf life requirements. Further advancements in NANO and MEMS materials or devices for applications in coatings, structural materials, energetics, inertial or environmental sensors, actuators, controllers, micro fluidics, RF components, and energy conversion will depend upon resolving the associated technical barriers.

#### OBJECTIVES

The workshop will focus on the identification of these application requirements, issues, or technical barriers and then explore the possible approaches for advancement. The program is arranged to provide adequate time for technical discussion stimulated by invited presentations directed toward a better understanding of the technical applications and issues of NANO and MEMS aging and shelf life. A broad range of technical expertise is expected to be represented by the workshop participants with opportunities for future technical collaborations.

#### TOPICS

The topics of special interest include:

- Applications requirements for aging & shelf life where NANO/MEMS is incorporated
- Materials issues regarding aging and shelf life that are unique to NANO/MEMS.
- Impact of scaling down in size to NANO/MEMS dimensions on aging & shelf life.
- Packaging concerns relating to aging and shelf life with NANO/MEMS devices.
- Interfaces of materials and device structures involving NANO/MEMS that impact aging and shelf life.
- Aging and degradation models for NANO-devices.
- Accelerated aging studies to identify the mechanisms for aging of NANO-scale systems.
- Exploitation of physical and chemical properties that affect the aging of NANO/MEMS-materials.

The workshop is organised by

- Paul Ashley, *AMRDEC, Redstone Arsenal, USA*
- Thomas Winkler, *Fraunhofer IZM, MMCB, Berlin and Chemnitz, Germany*
- John Johnson, *AMRDEC - European Research Office, London, U.K.*
- Mohan Sanghadasa, *AEgis Technologies Group, USA*

The workshop is supported by the U.S. Army International Technology Center – Atlantic, Research Division.

**Tuesday, Sept. 4, 08:30 – 12:15, Early Late Morning Session /3.1/  
Aging and Shelf Life of NANO/MEMS Technology I**

Chairmen: P. Ashley (*AMRDEC, Redstone Arsenal, USA*)  
T. Winkler (*Fraunhofer IZM, MMCB, Berlin and Chemnitz, Germany*)

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08:30 Dr. Paul Ashley  
*AMRDEC, Redstone Arsenal, USA*

**Introduction**

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08:40 Dr. Reiner Mönig<sup>1</sup>, Prof. Carl V. Thompson<sup>2</sup>  
<sup>1</sup> *Forschungszentrum Karlsruhe, Germany*  
<sup>2</sup> *Massachusetts Inst. of Technology, Cambridge, USA*

**Residual stress in MEMS/NEMS materials, and the effects, mechanisms, and solutions for long term stress relaxation via creep**

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09:10 Dr. Meyya Meyyappan, Chief Scientist for Exploration Technology  
*Center for Nanotechnology, NASA Ames Research Center, Moffett Field, USA*

**Radiation effects on nanosystems**

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09:40 Dr. Michael T. Dugger, Distinguished Member of Technical Staff  
*Sandia National Laboratories, Albuquerque, USA*

**Aging effects on the surface chemistry and resulting performance of microsystems**

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10.10 – 10.45 Coffee break

**Tuesday, Sept. 4, 8:30 - 10:15, Early Morning Session /3.2/,  
Reliability analysis and modelling III**

Chairmen: T. Rang (*Technical University Tallinn, Estonia*)  
T. Brunschwiler (*IBM Research GmbH, Rüschlikon, Switzerland*)

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08:30 Hauck, T., Schmadlak, I.  
*Key-note* *Freescale Halbleiter Deutschland GmbH, Munich, Germany*

**Procedure to assess interface cracks in CMOS BEOL stack up designs with Finite Element simulation and energy based fracture mechanics approach**

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08:55 Schacht, R.<sup>1,3</sup>, Meli, E.<sup>2</sup>, May, D.<sup>1</sup>, Wittler, O.<sup>1</sup>, Wunderle, B.<sup>1</sup>, Michel, B.<sup>1</sup>, Reichl, H.<sup>2</sup>  
<sup>1</sup> *Fraunhofer Institute for Reliability and Microintegration (IZM), Micro Materials Center, Berlin*  
<sup>2</sup> *Technical University of Berlin*  
<sup>3</sup> *Fachhochschule-Lausitz, Senftenberg, Germany*

**Effective thermal material models for multi layer PCBs with thermal vias**

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09:15 Kaufersch, E.<sup>1</sup>, Rzepka, S.<sup>2</sup>, Ganeshan, V.<sup>2</sup>, Müller, A.<sup>2</sup>, Michel, B.<sup>1</sup>  
<sup>1</sup> *Fraunhofer IZM, Micro Materials Center Berlin and Chemnitz*  
<sup>2</sup> *Qimonda Dresden GmbH & Co OHG, Dresden, Germany*

**Fast shear testing and FEM simulations for determination of dynamic mechanical behavior of SnAgCu BGA solder joints**

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09:35 Zacharopoulos, D.A., Pategakis, S., Plistakas, N.  
*Democritus University of Thrace, Xanthi, Greece*  
**Approach on the problem of crack path stability at different test specimens**

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09.55 – 10.45 Coffee break

**Tuesday, Sept. 4, 8:30 - 10:15, Early Morning Session /3.3/,  
Optical metrology & deformation analysis**

Chairmen: R.J. Pryputniewicz (*Worcester Polytechnic Institute, USA*)  
W. Osten (*University of Stuttgart, Germany*)

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08:30 Osten, W.  
*Key-note, invited University of Stuttgart, Germany*

**Resolution enhanced approaches in optical metrology**

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08:55 Keller, J.<sup>1</sup>, Gollhardt, A.<sup>2</sup>, Vogel, D.<sup>2</sup>, Michel, B.<sup>2</sup>  
<sup>1</sup> *AMIC Angewandte Micro-Messtechnik GmbH, Berlin*  
<sup>2</sup> *Fraunhofer IZM, Micro Materials Center, Berlin, Germany*

**Nanodeformation measurements for reliability studies of nanosystems**

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09:15 Walter, H.<sup>1,4</sup>, Seiler, B.<sup>2</sup>, Bombach, C.<sup>3</sup>, Michel, B.<sup>4</sup>  
<sup>1</sup> *AMIC Angewandte Messtechnik GmbH, Berlin*  
<sup>2</sup> *Chemnitzer Werkstoffmechanik GmbH, Chemnitz*  
<sup>3</sup> *Berliner Nanotest und Design GmbH*  
<sup>4</sup> *Fraunhofer IZM, Micro Materials Center, Berlin, Chemnitz*

**Determination of Poisson's ratio of electronic packaging materials dependent on temperature by means of UNIDAC-method**

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09:35 Schneider, D., Schultrich, B.  
*Fraunhofer IWS, Dresden, Germany*

**Testing thin films and surfaces by the laser-acoustic test method Lawave**

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09:55 Barabanenkov, M.Yu., Barabanenkov, Yu.N.  
*Russian Academy of Science, Chernogolovka, Russia*

**Distant- and interference-spatial spectroscopy of evanescent waves**

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10.15 – 10.45 Coffee break

**Tuesday, Sept. 4, 8:30 - 10:15, Early Morning Session /3.4/,  
Micro- and Nanomaterials III**

Chairmen: N. Pugno (*Politecnico di Torino, Italy*)  
M. Scherzer (*TU Bergakademie Freiberg, Germany*)

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08:30                      Carpinteri, A., Pugno, N.  
*Key-note*                      *Politecnico di Torino, Italy*  
**Strength of hierarchical materials**

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08:55                      Khromov, A., Bukhanko, A., Kocherov, E., Fedorchenko, D.  
*Samara State Aerospace University named after S.P.  
Korolyov, Russia*  
**Deformation states and fracture characteristics of  
plastic materials**

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09:15                      Boeffel, C., Müller, J., Müller, R., Bauer, M.  
*Fraunhofer IZM, Teltow, Germany*  
**The Calcium test: A versatile tool for the  
investigation of barrier properties of polymers and  
reliability tests of encapsulation processes**

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09:35                      Gesang, T., Rodewald, R.  
*Fraunhofer IFAM, Bremen, Germany*  
**Optimisation of micro stress in adhesive bonds in  
electro optics and micro optics**

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09:55                      Benfdila, A.  
*The University M. Mammeri, Tizi-Ouzou, Algeria*  
**Recent advances in nanoMOSFET technology**

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10.15 – 10.45      Coffee break

**Tuesday, Sept. 4, 8:30 - 10:15, Early Morning Session /3.5/,  
ESD and failure of electronic components**

Chairman: M. Saka (*Tohoku University, Sendai, Japan*)  
H. A. Gieser (*Fraunhofer IZM, München, Germany*)

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08:30 Gieser, H.A.  
*Key-note, invited Fraunhofer IZM, München, Germany*

**Electrostatic challenges and countermeasures for  
devices with MicroNanoDimensions**

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08:55 Ndip, I., Guttowski, S., Reichl, H.  
*Fraunhofer IZM, Berlin, Germany*

**M3-approach for reliable electrical design of  
advanced packages and boards**

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09:15 Kusnezoff, M.<sup>1</sup>, Trofimenko, N.<sup>1</sup>, Mosch, S.<sup>1</sup>, Beckert, W.<sup>1</sup>, Graff,  
A.<sup>2</sup>, Altmann, F.<sup>2</sup>  
<sup>1</sup> *Fraunhofer IKTS, Dresden*  
<sup>2</sup> *Fraunhofer IWMH, Halle/S., Germany*

**Stability of uLSM/8YSZ-interface in the composite  
cathode at high current densities**

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09:35 Schimpf, C.<sup>1</sup>, Feldmann, K.<sup>1</sup>, Matzner, C.<sup>1</sup>, Steinke, A.<sup>2</sup>  
<sup>1</sup> *University of Erlangen-Nuremberg, Erlangen*  
<sup>2</sup> *CiS Institut für Mikrosensorik GmbH, Erfurt, Germany*

**Failure of electronic devices due to condensation**

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09:55 Suñé, J.<sup>1</sup>, Wu, E.<sup>2</sup>, Tous, S.<sup>1</sup>  
<sup>1</sup> *Autonomous University of Barcelona*  
<sup>2</sup> *IBM Microelectronics Division, Essex Junction, Spain*

**Physics-based percolation model for the breakdown  
of ultra-thin (down to 1 nm) gate oxides for  
advanced CMOS**

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10.15 – 10.45 Coffee break

**Tuesday, Sept. 4, 8:30 - 10:15, Early Morning Session /3.6/,  
Reliability applications II**

Chairmen: W. Wondrak, (*DaimlerChrysler, Böblingen, Germany*)  
M. Vormoor (*BMW-Group, Munich, Germany*)

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08:30 Kohl, R., Trageser, H., Schuch, B.  
*Key-note Conti Temic microelectronic GmbH, Nuremberg,  
Germany*

**Reliability aspects of automotive electronic control  
units viewed from a TIER1 supplier perspective**

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08:55 Vormoor, M.  
*Key-note BMW Bayerische Motoren Werke AG, Munich, Germany*

**Increase of safety – better visibility by self-cleaning  
glasses**

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09:15 Böhme, B., Wolter, K.-J.  
*Dresden University of Technology, Germany*

**Characterization of organic substrate materials for  
high temperature automotive applications**

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09:35 Shaporin, A., Doetzel, W., Mehner, J.  
*Chemnitz University of Technology, Germany*

**Test-structures for MEMS reliability analysis**

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09:55 Middendorf, A.<sup>1</sup>, Keller, J.<sup>2</sup>, Walter, H.<sup>2</sup>, Reichl, H.<sup>1</sup>  
<sup>1</sup> *Technical University of Berlin*  
<sup>2</sup> *AMIC GmbH, Berlin, Germany*

**Reliability aspect integration in the early stages of  
design processes for mechatronic systems**

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10.15 – 10.45 Coffee break

**Tuesday, Sept. 4, 08:30 – 12:15, Late Morning Session /4.1/  
Aging and Shelf Life of NANO/MEMS Technology II**

Chairmen: P. Ashley (*AMRDEC, Redstone Arsenal, USA*)  
Mike Kranz (*AEgis Technologies Group, USA*)

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10:45 Dr. Jud Ready, Ph.D., Sr. Research Engineer & Adj. Professor  
*Georgia Tech Research Institute, Atlanta, USA*

**Arrhenius or erroneous ? An extrapolation of  
accelerated aging and degradation models from  
micro to nano**

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11:15 Dr. Philippe Perdu, Senior Expert  
*French National Space Institute (CNES), Toulouse,  
France*

**Long term reliability issues in the deep-submicron  
range**

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11:45 Dr. Zhiyu Hu<sup>1</sup>, Arnab Choudhury<sup>2</sup>, Peter J. Hesketh<sup>2</sup>, Thomas  
Thundat<sup>1</sup>  
<sup>1</sup> *Biosciences Division, Oak Ridge National Laboratory,  
Oak Ridge*  
<sup>2</sup> *G. W. School of Mechanical Engineering, Georgia  
Institute of Technology, Atlanta, USA*

**Analysis of environmentally-induced surface stress  
and its use in understanding non-operational aging  
of MEMS devices**

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12.15 – 13.30 Lunch break

**Tuesday, 10:45 – 12:10, Late Morning Session /4.2/,  
Reliability analysis and modelling IV**

Chairmen: T. Hauck (*Freescale Halbleiter Deutschland GmbH, Munich, Germany*)  
W.D. van Driel (*NXP Semiconductors, Nijmegen, The Netherlands*)

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10:45 van der Sluis, O.<sup>1,2</sup>, van Silfhout, R.B.R.<sup>1</sup>, Engelen, R.A.B.<sup>1</sup>, van Driel, W.D.<sup>2,3</sup>, Zhang, G.Q.<sup>2,3</sup>

Key-note

<sup>1</sup> *Philips Applied Technologies, Eindhoven*

<sup>2</sup> *Delft University of Technology*

<sup>3</sup> *NXP Semiconductors, Nijmegen, The Netherlands*

**Energy based damage sensitivity analysis of complex 3D structures with an application to IC bond pads**

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11:10

Brocke, H.

*Fraunhofer Institut für Holzforschung, Wilhelm-Klauditz-institut, Braunschweig, Germany*

**A finite element based comparison of the reliability of Cu interconnects with CF polymer and SiLK™ as low k dielectrics**

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11:30

Schindler, S.<sup>1</sup>, Dresbach, C.<sup>2</sup>, Wolter, K.-J.<sup>1</sup>, Petzold, M.<sup>2</sup>

<sup>1</sup> *Dresden University of Technology*

<sup>2</sup> *Fraunhofer IWMH, Halle/S., Germany*

**The influence of bond process parameters on the microstructure of bonding wires**

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11:50

Ranatowski, E.

*University of Technology and Life Science, Bydgoszcz, Poland*

**Thermal modelling of laser welding**

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12.10 – 13.30 Lunch break

**Tuesday, 10:45 – 12:10, Late Morning Session /4.3/,  
Characterization and testing I**

Chairmen: N. Barbosa (*NIST Nat. Inst. of Standards & Technol., Boulder, USA*)  
D. Schneider (*Fraunhofer IWS, Dresden, Germany*)

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10:45 Ikehara, T.<sup>1</sup>, Tsuchiya, T.<sup>2</sup>

Key-note

<sup>1</sup> *National Institute of Advanced Industrial Science and  
Technology (AIST), Tsukuba*

<sup>2</sup> *Kyoto University, Japan*

**Parallel fatigue test of micromachined single crystal  
silicon using lateral resonating device**

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11:10 Striegler, A., Bendjus, B., Köhler, B.

*Fraunhofer IZFP, Dresden, Germany*

**The potential of the Atomic Force Acoustic  
Microscopy for visualisation of subsurface voids**

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11:30 Li, Q.<sup>1,2,3</sup>, Goosen, H.<sup>2</sup>, van Keulen, F.<sup>2</sup>, van Beek, J.<sup>3</sup>,  
Zhang, G.Q.<sup>2,3</sup>

<sup>1</sup> *Netherlands Institute of Metals Research NIMR, Delft*

<sup>2</sup> *Delft University of Technology*

<sup>3</sup> *NXP Semiconductors, Eindhoven/Nijmegen, The  
Netherlands*

**Assessment of testing methodologies for thin-film  
vacuum MEMS packages**

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11:50 Tabanyukhova, M.V.

*The Novosibirsk State University of Architecture and Civil  
Engineering (NGASU), Novosibirsk, Russia*

**Photoelastic analysis of fracture mechanic problems  
in elements with angular notches**

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12.10 – 13.30 Lunch break

**Tuesday, Sept. 4, 10:45 – 12:10, Late Morning Session /4.4/,  
Micro- and Nanomaterials IV**

Chairmen: C. Uhlig (*Fraunhofer IZM, Teltow, Germany*)

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10:45 Morris, J.E.

*Key-note, invited* *Portland State University, Portland, USA*

**Nanopackaging: nanotechnologies and electronics packaging**

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11:10 Lang, U., Dual, J.

*ETH Swiss Federal Institute of Technology Zürich,  
Switzerland*

**Method for observing crack propagation in thin polymer films**

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11:30 Auerswald, E., Walter, H., Wittler, O., Gollhardt, A., Michel, B.

*Fraunhofer IZM, Micro Materials Center, Berlin, Germany*

**Experimental characterization of thin Copper foils**

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10:50 Bertholet, Y.<sup>1,2</sup>, Olbrechts, B.<sup>1,3</sup>, Raskin, J.-P.<sup>1,3</sup>, Pardoën, T.<sup>1,2</sup>

<sup>1</sup> *Université catholique de Louvain, CeRMiN*

<sup>2</sup> *Université catholique de Louvain, IMAP*

<sup>3</sup> *Université catholique de Louvain, EMIC, Belgium*

**Molecular bonding aided by dissipative interlayers**

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12.10 – 13.30 Lunch break

**Tuesday, Sept. 4, 10:45 – 12:10, Late Morning Session /4.5/,  
Reliability concepts III**

Chairmen: R. Dudek (*Fraunhofer IZM, MMCB, Chemnitz, Germany*)  
J. Wilde (*University of Freiburg, IMTEK, Germany*)

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10:45 Tilgner, R.  
*Key-note, invited Infineon Technologies AG, Munich, Germany*  
**Physics of Failure (PoF) for interconnect structures -  
an essay**

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11:10 Ghisi, A.<sup>1</sup>, Fachin, F.<sup>1</sup>, Mariani, S.<sup>1</sup>, Corigliano, A.<sup>1</sup>, Zerbini, S.<sup>2</sup>  
*Key-note* <sup>1</sup> *Politecnico di Milano*  
<sup>2</sup> *STMicroelectronics, Cornaredo, Italy*  
**Multi-scale analysis of polysilicon MEMS subject to  
drop impacts**

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11:30 Müller, W.  
*Technical University of Berlin, Germany*  
**How to extract continuum materials properties for  
lead-free solders from tensile tests and  
nanoindentation experiments**

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11:50 Biesheuvel, M.<sup>1</sup>, van Soestbergen, M.<sup>1</sup>, Rongen, R.<sup>2</sup>, Ernst, L.J.<sup>3</sup>,  
Zhang, G.Q.<sup>2,3</sup>  
<sup>1</sup> *Netherlands Institute of Metals Research NIMR, Delft*  
<sup>2</sup> *NXP Semiconductors, Nijmegen*  
<sup>3</sup> *Delft University of Technology, The Netherlands*  
**A numerical failure model for ion-transport related  
gate leakage**

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12.10 – 13.30 Lunch break

**Tuesday, Sept. 4, 10:45 – 12:10, Late Morning Session /4.6/,  
Reliability applications III**

Chairmen: G. Georgakos (*Infineon Technologies AG, Neubiberg, Germany*)  
R. Schwaiger (*Forschungszentrum Karlsruhe, Germany*)

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10:45 Farley, D.<sup>1</sup>, Zhou, Y.<sup>1</sup>, Dasgupta, A.<sup>1</sup>, Caers, J.F.J.M.<sup>2</sup>,  
de Vries, J.W.C.<sup>2</sup>

*Key-note* <sup>1</sup> *The University of Maryland, CALCE, College Park, USA*  
<sup>2</sup> *Philips Applied Technologies, Eindhoven, The Netherlands*

**Reliability of RF SiP assemblies under mechanical loads**

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11:10

Coulombier, M.<sup>1,3</sup>, Gravier, S.<sup>1,3</sup>, Pardoën, T.<sup>1,3</sup>, Fabregue, D.<sup>4</sup>  
Andre, N.<sup>2,3</sup>, Hourri, S.<sup>2,3</sup>, Raskin, J.-P.<sup>2,3</sup>

<sup>1</sup> *Université catholique de Louvain, Dept. Materials Science and Processes,*

<sup>2</sup> *Université catholique de Louvain, Dept. Electr. Engng.,*

<sup>3</sup> *Université catholique de Louvain, CeRMiN, Belgium*

<sup>4</sup> *INSA-Institute National of Applied Sciences of Lyon, France*

**New concept of multipurpose on-chip nanomechanical laboratory**

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11:30

Drumea, A., Vasile, A., Vulpe, V.

*University Politehnica of Bucharest, Romania*

**Safety and reliability aspects in design and construction of an infusion pump medical system**

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11:50

Shamshirsaz, M.<sup>1</sup>, Gheisarieha, M.<sup>2</sup>, Maroufi, M.<sup>1</sup>

<sup>1</sup> *Amirkabir University of Technology (Tehran Polytechnic), Tehran*

<sup>2</sup> *Sharif University of Technology, Tehran, Iran*

**Influence of material stiffness and geometrical variations on the electro-thermally driven microactuator performance**

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12.10 – 13.30 Lunch break

**Tuesday, Sept. 4, 13:30 - 15:15, Early Afternoon Session /5.1/,  
Reliability of MEMS I**

Chairmen: D.F. Bahr (*Washington State University, Pullman, USA*)  
T. Otto (*Fraunhofer IZM, MDE Chemnitz, Germany*)

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13:30 Lavu, S.<sup>1,3</sup>, Muratet, S.<sup>2</sup>, Fourniols, J.Y.<sup>2</sup>, Abraham, E.<sup>1</sup>,  
Desmulliez, M.<sup>1</sup>, De Wolf, I.<sup>3</sup>

*Key-note* <sup>1</sup> *Heriot-Watt University, Edinburgh, U.K.*

<sup>2</sup> *LAAS-CNRS 7, Toulouse, France*

<sup>3</sup> *IMEC, Leuven, Belgium*

**Failure modes and mechanisms in MEMS thermal  
actuators**

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13:55 Souchon, F., Charvet, P.L.

*CEA-LETI-MINATEC, Grenoble, France*

**Identification of dielectric charging on MEMS  
switches**

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14:15 Gaspar, J.C., Paul, O.

*University of Freiburg, IMTEK, Germany*

**Reliability of LPCVD Silicon Nitride as a structural  
material for MEMS applications**

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14:35 Meiß, K.-M., Eisenberg, W., Biesecke, C., Nerlich, V.

*Arnold-Sommerfeld-Gesellschaft, Leipzig, Germany*

**Virtual microorganism (VMO) – System of  
engineering and reliability**

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14.55 – 15.45 Coffee break

15:45 – 16:15 Poster discussion

**Tuesday, Sept. 4, 13:30 – 15:15, Early Afternoon Session /5.2/,  
Solder Joint & Interconnect Reliability I**

Chairmen: P.M. Svasta (*Politehnica University of Bucharest, Romania*)  
H. Walter (*Fraunhofer IZM, MMCB, Berlin, Germany*)

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13:30 Zimprich, P., Saeed, U., Betzwar-Kotas, A., Khatibi, G., Weiss, B.,  
Ipser, H.

*Key-note* *University of Vienna, Austria*

**Miniaturized lead-free solder joints and their  
response to dimensional constraints**

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13:55 Nieland, S., Bähr, M., Böttger, A.

*SolarZentrum Erfurt, CiS Institut für Mikrosensorik GmbH,  
Erfurt, Germany*

**Advantages of microelectronic packaging for  
reliable lead free soldering of thin solar cells**

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14:15 Röllig, M., Wiese, S., Meier, K., Müller, M., Wolter, K.-J.

*Dresden University of Technology, Germany*

**Experimental method for creep measurements on  
real package solder joints on the example of  
SnAg3.5 alloy**

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14:35 Khatibi, G.<sup>1</sup>, Zimprich, P.<sup>1</sup>, Wroczewski, W.<sup>1</sup>, Groeger, V.<sup>1</sup>,  
Weiss, B.<sup>1</sup>, Licht, T.<sup>2</sup>

<sup>1</sup> *University of Vienna, Austria*

<sup>2</sup> *Infineon Technologies AG, Warstein, Germany*

**Quality assessment of interconnects by an  
accelerated shear fatigue testing method**

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14:55 Dresbach, C.<sup>1</sup>, Schischka, J.<sup>1</sup>, Knoll, H.<sup>1</sup>, Seifert, T.<sup>2</sup>, Müller, T.<sup>3</sup>,  
Petzold, M.<sup>1</sup>

<sup>1</sup> *Fraunhofer IWMH, Halle/S.*

<sup>2</sup> *Fraunhofer IWM, Freiburg*

<sup>3</sup> *W.C. Heraeus GmbH, Hanau, Germany*

**Local mechanical deformation properties of Gold  
wire bonding wires and free air balls**

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15.15 – 15.45 Coffee break

15:45 – 16:15 Poster discussion

**Tuesday, Sept. 4, 13:30 – 15:15, Early Afternoon Session /5.3/,  
Characterization and testing II**

Chairmen: Y. Katz (*Negba Institute, Beer Sheva, Israel*)  
L. Getsov (*St.-Petersburg State Polytechnical University, Russia*)

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13:30 Mazza, E.<sup>1</sup>, Schifferle, A.<sup>2</sup>  
Key-note <sup>1</sup> *ETH Swiss Federal Institute of Technology Zürich*  
<sup>2</sup> *CSEM SA, Neuchatel, Switzerland*  
**A novel device for the mechanical characterization  
of micro-beams**

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13:55 Zschenderlein, U.<sup>1</sup>, Kämpfe, B.<sup>2</sup>, Schultrich, B.<sup>3</sup>, Fritsche, G.<sup>1</sup>  
<sup>1</sup> *Chemnitz University of Technology*  
<sup>2</sup> *Fraunhofer IZM, Micro Materials Center, Berlin*  
<sup>3</sup> *Fraunhofer IWS, Dresden, Germany*  
**Application of energy dispersive X-ray diffraction for  
the efficient investigation of internal stresses in thin  
films**

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14:15 Vogel, D.<sup>1</sup>, Gollhardt, A.<sup>1</sup>, Sabate, N.<sup>2</sup>, Michel, B.<sup>1</sup>  
<sup>1</sup> *Fraunhofer IZM, Micro Materials Center, Chemnitz,  
Germany*  
<sup>2</sup> *Centre Nacional de Microelectrònica (CNM-CSIC),  
Bellaterra, Spain*  
**Data evaluation issues for stress release  
measurements on MEMS layers**

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14:35 Wolf, J.<sup>1</sup>, Raudzis, C.<sup>1</sup>, Mueller-Fiedler, R.<sup>1</sup>, Seidel, H.<sup>2</sup>  
<sup>1</sup> *Robert Bosch GmbH, Stuttgart*  
<sup>2</sup> *Saarland University, Saarbrücken, Germany*  
**Novel resonant sensors for measuring the influence  
of package-induced stress on inertial sensors**

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14:55 Hanke, R.<sup>1</sup>, Krüger, P.<sup>2</sup>  
<sup>1</sup> *Fraunhofer IIS, EZRT, Fürth,*  
<sup>2</sup> *Fraunhofer IZFP-D, EZRT, Dresden, Germany*  
**Methods of micro and nano CT for the  
characterization of microcomponents**

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15.15 – 15.45 Coffee break  
15:45 – 16:15 Poster discussion

**Tuesday, Sept. 4, 13:30 – 15:15, Early Afternoon Session /5.4/,  
Micro- and Nanomaterials V**

Chairmen: M. Werner (*NMTC Berlin, Germany*)  
M. Petzold (*Fraunhofer IWMH, Halle/S., Germany*)

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13:30 Schwaiger, R.  
*Key-note, invited* *Forschungszentrum Karlsruhe, Karlsruhe, Germany*  
**Mechanical properties in small dimensions**

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13:55 Kahle, O.<sup>1,2</sup>, Uhlig, C.<sup>2</sup>, Bauer, M.<sup>1,2</sup>  
<sup>1</sup> *Brandenburg Technical University Cottbus*  
<sup>2</sup> *Fraunhofer IZM, Teltow, Germany*  
**Thermophysical characterisation of sub- $\mu\text{m}$  polymer layers by Nano-TMA/TGA/DVS**

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14:15 Yasuoka, M., Doi, B.S., Ando, I.  
*Nachi-Fujokoshi Corporation, Toyama, Japan*  
**Ultralong fatigue estimation of cemented carbide WC-Co**

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14:35 Kämpfe, B.<sup>1</sup>, Luczak, F.<sup>2</sup>, Zimny, F.<sup>3</sup>, Petrick, H.<sup>3</sup>, Böhme, H.<sup>4</sup>  
<sup>1</sup> *Fraunhofer IZM, Micro Materials Center, Berlin*  
<sup>2</sup> *Technical University of Berlin*  
<sup>3</sup> *Petrick GmbH, Bad Blankenburg*  
<sup>4</sup> *FPM Holding GmbH, Freiberg, Germany*  
**Possibilities and application fields of energy-dispersive X-ray diffraction for the investigation of microsystems**

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14.55 – 15.45 Coffee break  
15:45 – 16:15 Poster discussion

**Tuesday, Sept. 4, 13:30 – 15:15, Early Afternoon Session /5.5/,  
Nanoscale strength and reliability I**

Chairmen: J. Keller (*AMIC, Berlin, Germany*)  
N. Morozov (*St.-Petersburg State University, Russia*)

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13:30 Gerberich, W.W., Mook, W.M., Beaber, A.R.  
*Key-note, invited University of Minnesota, Minneapolis, USA*  
**Nanoscale strength and reliability probes**

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13:55 Deromelaere, G., Felten, F., Hiller, P., Knoblauch, V.  
*Key-note Robert Bosch GmbH, Stuttgart, Germany*  
**Reliability assessment of brittle materials – a new  
approach to improve prediction quality**

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14:15 Ereemeev, V., Indeitsev, D., Ivanova, E., Morozov, N., Semenov, B.  
*St.-Petersburg State University, Russia*  
**Mechanics and nanomechanics**

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14:35 Kozhushko, V., Hess, P.  
*University of Heidelberg, Germany*  
**Nanoscopic mechanism of mode I and mode II  
fracture of Silicon**

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14:55 Petzold, M.<sup>1</sup>, Klengel, R.<sup>1</sup>, Knoll, H.<sup>1</sup>, Schischka, J.<sup>1</sup>, Altmann, F.<sup>1</sup>,  
Müller, T.<sup>2</sup>, Chung, E.K.<sup>3</sup>.  
<sup>1</sup> *Fraunhofer IWMH, Halle/S.*  
<sup>2</sup> *W.C. Heraeus GmbH, Hanau, Germany*  
<sup>3</sup> *Heraeus Oriental HiTec Co., Incheon, Korea*  
**Nanoreliability of Au wire bonding interconnects**

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15.15 – 15.45 Coffee break  
15:45 – 16:15 Poster discussion

**Tuesday, Sept. 4, 13:30 – 15:15, Early Afternoon Session /5.6/,  
Reliability applications IV**

Chairmen: B. Foucher (*EADS Innovation Works, Suresnes, France*)  
S. Mariani (*Politecnico di Milano, Italy*)

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13:30 Obreja, V.V.V.N.<sup>1</sup>, Svasta, P.M.<sup>2</sup>  
*Key-note, invited* <sup>1</sup> *National R&D Institute for Microtechnology (IMT –  
Bucuresti)*  
<sup>2</sup> *Politehnica University Bucharest, Romania*

**The semiconductor – dielectric interface from PN  
junction periphery and its influence on reliability of  
power devices at high temperature**

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13:55 Goroll, M., Pufall, R., Aresu, S., Kanert, W.  
*Infineon Technologies AG, Neubiberg, Germany*

**Reliability of bipolar transistors – new aspects for  
lifetime determination in automotive applications**

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14:15 Rangu, M.<sup>1</sup>, Svasta, P.M.<sup>2</sup>  
<sup>1</sup> *Politehnica University of Timisoara*  
<sup>2</sup> *Politehnica University of Bucharest, Romania*

**Computer aided design techniques for fine tuning  
the printed circuit traces impedances**

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14:35 Zhuravliov, V.I., Alexeev, V.F.  
*Belarusian State University of Informatics and  
Radioelectronics, Minsk, Belarus*

**Critical temperature estimation of heating of  
semiconductor devices at HEMP actions**

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14:55 Aresu, S., Kanert, W., Pufall, R., Goroll, M.  
*Infineon Technologies AG, Neubiberg, Germany*

**Latent effect of Backend Of Line (BEOL) plasma  
cleaning process on silicon gate oxide reliability**

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15.15 – 15.45 Coffee break  
15:45 – 16:15 Poster discussion

**Tuesday, Sept. 4, 16:15 – 17:40, Late Afternoon Session /6.1/,  
Reliability of MEMS II**

Chairmen: N. Meyendorf (*Fraunhofer IZFP, Dresden, Germany*)  
M. Wiemer (*Fraunhofer IZM, Chemnitz, Germany*)

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16:15 van Driel, W.D.<sup>1,2</sup>, Yang, D.G.<sup>1</sup>, van Kleef, M.<sup>1</sup>, Zhang, G.Q.<sup>1,2</sup>  
*Key-note* <sup>1</sup> *NXP Semiconductors, Nijmegen,*  
<sup>2</sup> *Delft University of Technology, The Netherlands*

**Challenges for MEMS packaging: Capping**

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16:40 Hirsch, S., Majcherek, S., Leneke, T., Schmidt, B.  
*Otto-von-Guericke-Universität Magdeburg, Germany*  
**A Silicon test chip for thermomechanical analysis of  
MEMS packagings**

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17:00 Uruska, D., Friedel, K  
*Wroclaw University of Technology, Poland*  
**Stress induced on the MEMS active surface and  
deformation of MEMS due to moulding of  
MEMS/ASIC system**

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17:20 Koglin, J.  
*FRT Fries Research & Technology GmbH, Bergisch  
Gladbach, Germany*  
**Quality assurance and production control of MEMS  
and wafers with multi-sensor metrology systems**

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17.40 Closure  
19:00 – 23:00 Banquet cruise

**Tuesday, Sept. 4, 16:15 – 17:40, Late Afternoon Session /6.2/,  
Solder Joint & Interconnect Reliability II**

Chairmen: W. Kanert (*Infineon Technologies AG, Neubiberg, Germany*)  
J. Auersperg (*Fraunhofer IZM, MMCB Berlin/Chemnitz*)

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16:15 Huang, Z., Conway, P.

Key-note

*Loughborough University, Leicestershire, U.K.*

**Modelling of interfacial intermetallic compounds in  
the applications of very fine lead-free solder  
interconnections**

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16:40 Meier, K.<sup>1</sup>, Wiese, S.<sup>1</sup>, Scholz, D.<sup>2</sup>, Rzepka, S.<sup>2</sup>, Nocke, K.<sup>2</sup>,  
Luhmann, C.<sup>2</sup>, Röllig, M.<sup>1</sup>, Wolter, K.-J.<sup>1</sup>

<sup>1</sup> *Dresden University of Technology*

<sup>2</sup> *Qimonda Dresden GmbH & Co. OHG, Dresden,  
Germany*

**Investigations on the dynamic elastic-plastic  
behaviour of solder joints using a novel high strain  
rate experimental setup**

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17:00 Smorodin, T.<sup>1</sup>, Wilde, J.<sup>2</sup>, Stecher, M.<sup>1</sup>

<sup>1</sup> *Infineon Technologies AG, Munich*

<sup>2</sup> *University of Freiburg, IMTEK, Germany*

**Crack propagation in the interlayer dielectric of a  
power technology metallization under fast  
temperature-cycle stress**

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17:20 Dreßler, M.<sup>1</sup>, Liebing, G.<sup>1</sup>, Becker, K.-F.<sup>2</sup>, Wunderle, B.<sup>2</sup>,  
Reichl, H.<sup>3</sup>

<sup>1</sup> *Robert Bosch GmbH, Waiblingen*

<sup>2</sup> *Fraunhofer IZM, Berlin*

<sup>3</sup> *Technical University of Berlin, Germany*

**Application of interfacial fracture mechanics  
approach for obtaining design rules for flip chip  
interconnections**

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17.40 Closure  
19:00 – 23:00 Banquet cruise

**Tuesday, Sept. 4, 16:15 – 17:40, Late Afternoon Session /6.3/,  
Characterization and testing III**

Chairmen: J. Villain (*University of Applied Sciences Augsburg, Germany*)  
M. Ebert (*Fraunhofer IWMH, Halle/S., Germany*)

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16:15 Barbosa, N., Read, D., Keller, R., Geiss, R.  
*Key-note* *National Institute of Standards and Technology NIST,  
Boulder, USA*

**An electrical approach to measuring reliability and  
mechanical properties of interconnects**

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16:40 Simonov, I. V., Sirotin, A.A.  
*Institute for Problems in Mechanics of the RAS, Moscow,  
Russia*

**Microfibers testing by electromagnetic radiation  
method**

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17:00 Matkowski, P.<sup>1</sup>, Urbanski, K.<sup>1</sup>, Fałat, T.<sup>1</sup>, Felba, J.<sup>1</sup>, Zaluk, Z.<sup>1</sup>,  
Dasgupta, A.<sup>2</sup>, Pecht, M.<sup>2</sup>  
<sup>1</sup> *Wroclaw University of Technology, Poland*  
<sup>2</sup> *The University of Maryland, CALCE, College Park, USA*

**Combined temperature cycle and vibration reliability  
test of lead-free interconnections – event detection**

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17:20 Niklas, J.R.<sup>1</sup>, Dornich, K.<sup>2</sup>  
<sup>1</sup> *TU Bergakademie Freiberg*  
<sup>2</sup> *Freiberg Instruments GmbH, Freiberg, Germany*

**Contact-less topography and testing of electrical  
wafer parameters**

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17.40 Closure  
19:00 – 23:00 Banquet cruise

**Tuesday, Sept. 4, 16:15 – 17:40, Late Afternoon Session /6.4/,  
Micro- and Nanomaterials VI**

Chairmen: M. Desmulliez (*Heriot-Watt University, Edinburgh, U.K.*)  
G.N. Albaut (*Novosibirsk State University, Russia*)

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16:15 Töpper, M.<sup>1,2</sup>, Hoferling, K.<sup>2</sup>, Defo Kamga, F.<sup>1</sup>, Reichl, H.<sup>1</sup>  
*Key-note, invited* <sup>1</sup> *Fraunhofer IZM / TU-Berlin, Berlin, Germany*  
<sup>2</sup> *University of Utah, Salt Lake City, USA*

**Copper migration in thin film polymers**

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16:40 Gitis, N., Hermann, I., Khosla, V.  
*CETR, Campbell, USA*

**Non-destructive nano-mechanical reliability and  
defectivity characterization of thin films**

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17:00 Kübel, C.<sup>1</sup>, Lee, T.-C.<sup>2</sup>, Su, D.<sup>2</sup>, Luo, J.-S.<sup>3</sup>, Russell, J.<sup>3</sup>  
<sup>1</sup> *Fraunhofer IFAM, Bremen, Germany*  
<sup>2</sup> *Taiwan Semiconductor Manufacturing Company, Ltd.,*  
<sup>3</sup> *Inotera Memories, Physical Failure Analysis  
Department, Taoyuan, Taiwan*

**Application of electron tomography for  
semiconductor device analysis**

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17:20 Roth, H., Röder, M.  
*Phoenix X-ray Systems, Stuttgart, Germany*

**Visualising of internal 3D-structures with  
submicrometer resolution**

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17.40 Closure  
19:00 – 23:00 Banquet cruise

**Tuesday, Sept. 4, 16:15 – 17:40, Late Afternoon Session /6.5/,  
Nanoscale strength and reliability II**

Chairmen: J. Grimm (*University of Applied Sciences Zwickau, Germany*)  
H. Shirangi (*Fraunhofer IZM Berlin, Germany*)

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16:15 Turbini, L.<sup>1</sup>, Caputo, A.<sup>2</sup>  
*Key-note, invited* <sup>1</sup> *RIM Research In Motion, Waterloo, Ontario*  
<sup>2</sup> *University of Toronto, Ontario, Canada*

**Design limitations related to Conductive Anodic  
Filament (CAF) formation in a micro-world**

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16:40 Flaemig, J., Hammacher, J., Fuelle, A., Saupe, J., Zahn, W.,  
Grimm, J.

*Key-note* *University of Applied Sciences Zwickau, Germany*

**Reliability, tribology and mechanical properties of  
SU-8-layers for mechanical applications**

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17:00 Getsov, L.<sup>1</sup>, Semenov, A.<sup>1</sup>, Staroselsky, A.<sup>2</sup>  
<sup>1</sup> *St.-Petersburg State Polytechnical University, Russia*  
<sup>2</sup> *Pratt and Whitney, East Hartford, USA*

**A new TMF failure criterion for single crystal  
superalloys**

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17:20 Rudraraju, N.P., Morris, J.E.  
*Portland State University, USA*

**Reliability testing of nano-particle system packaging**

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17.40 Closure  
19:00 – 23:00 Banquet cruise

**Tuesday, Sept. 4, 16:15 – 17:40, Late Afternoon Session /6.6/,  
Reliability applications V**

Chairmen: L. Berka (*Czech Technical University in Prague, Czech Republic*)  
A. Middendorf (*Technical University of Berlin, Germany*)

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16:15 Georgakos, G., Huber, P., Ruckerbauer, F.  
*Key-note* *Infineon Technologies AG, Neubiberg, Germany*  
**Cosmic ray induced single-, multi-bit and latch-up failure mechanisms at sub 90nm embedded SRAMs for system-in-chip applications**

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16:40 Kornev, V. M.  
*Lavrentyev Institute of Hydrodynamics, Novosibirsk, Russia*  
**Two-scale model of crack propagation in high stress fatigue**

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17:00 Omiya, M.<sup>1</sup>, Kishimoto, K.<sup>2</sup>  
<sup>1</sup> *Keio University, Yokohama*  
<sup>2</sup> *Tokyo Institute of Technology, Japan*  
**UV-ray irradiation effects on microsystem crack formation of ceramic thin film on polymer substrate**

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17:20 Berka, L.  
*Czech Technical University in Prague, Czech Republic*  
**On a model and a theory of granulation processes**

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17.40 Closure  
19:00 – 23:00 Banquet cruise

**Wednesday, Sept. 5, 8:30 – 9:55, Early Morning Session /7.1/,  
Reliability and lifetime estimation**

Chairmen: M. Pecht (*University of Maryland, CALCE, College Park, USA*)  
B. Schuch (*Conti Temic microelectronic, Nuremberg, Germany*)

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08:30 Pufall, R., Kanert, W., Goroll, M., Aresu, S.

*Key-note*

*Infineon Technologies AG, Neubiberg, Germany*

**Lifetime prediction – The need for a new  
qualification approach for automotive due to the lack  
of acceleration factors**

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08:55 Wittler, O.<sup>1</sup>, Schindler-Saefkow, F.<sup>1</sup>, Schreier-Alt, T.<sup>2</sup>, Michel, B.<sup>1</sup>

<sup>1</sup> *Fraunhofer IZM, Micro Materials Center, Berlin*

<sup>2</sup> *Fraunhofer IZM, Munich, Germany*

**Assessment of package induced stresses for sensor  
applications**

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09:15 Sommer, J.-P.<sup>1</sup>, Michel, B.<sup>1</sup>, Petzold, M.<sup>2</sup>, Schönecker, A.<sup>3</sup>,  
Kusnezoff, M.<sup>3</sup>, Wunderle, B.<sup>1</sup>

<sup>1</sup> *Fraunhofer IZM, Micro Materials Center, Berlin*

<sup>2</sup> *Fraunhofer IWMH, Halle/S.*

<sup>3</sup> *Fraunhofer IKTS, Dresden, Germany*

**Nano-reliability within the framework of Fraunhofer  
market-oriented nano-scale activities**

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09:35 Nowack, M.<sup>1</sup>, Reuter, D.<sup>1</sup>, Rennau, M.<sup>1</sup>, Bertz, A.<sup>1</sup>, Geßner, T.<sup>1,2</sup>

<sup>1</sup> *Chemnitz University of Technology*

<sup>2</sup> *Fraunhofer IZM, Chemnitz, Germany*

**Wafer-level active testing of capacitive inertial  
sensors**

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09:55 – 10.30 Coffee break

**Wednesday, Sept. 5, 8:30 – 9:55, Early Morning Session /7.2/,  
Molecular modelling**

Chairmen: B. Wunderle (*Fraunhofer IZM, MMCB, Berlin, Germany*)  
P. Heino (*Tampere University of Technology, Finland*)

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08:30 Yuan, C.<sup>1</sup>, Dawotola, A.W.<sup>1</sup>, van der Sluis, O.<sup>1</sup>, Zhang, G.Q.<sup>1</sup>,  
Ernst, L.J.<sup>1</sup>, van Driel, W.D.<sup>2</sup>, van Silfhout, R.B.R.<sup>3</sup>, Thijsse, B.J.<sup>1</sup>

*Key-note*

<sup>1</sup> *Delft University of Technology*

<sup>2</sup> *NXP Semiconductors, Nijmegen*

<sup>3</sup> *Philips Applied Technologies, Eindhoven, The Netherlands*

**Molecular dynamics simulation on Silicon based materials and their interface**

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08:55 Dermitzaki, E.<sup>1</sup>, Bauer, J.<sup>1</sup>, Walter, H.<sup>2</sup>, Wunderle, B.<sup>1</sup>, Michel, B.<sup>1</sup>,  
Reichl, H.<sup>3</sup>

<sup>1</sup> *Fraunhofer IZM, Micro Materials Center, Berlin*

<sup>2</sup> *AMIC Angewandte Micro-Messtechnik GmbH, Berlin*

<sup>3</sup> *Technical University of Berlin, Germany*

**Molecular dynamics simulation and mechanical characterisation of epoxy resins examined at different temperatures**

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09:15 Capková, P.

*Technical University of Ostrava, Czech Republic*

**Molecular modelling combined with experiment in analysis and characterization of organo-inorganic hybrid nanostructures**

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09:35 Eisenberg, W., Renner, K., Boran, R.

*Arnold-Sommerfeld-Gesellschaft, Leipzig, Germany*

**Simulation of bio-complex systems with nano-cellular automata swarms and their reliability**

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09:55 – 10.30 Coffee break

**Wednesday, Sept. 5, 8:30 – 9:55, Early Morning Session /7.3/,  
Local stress analysis**

Chairmen: R.E. Geer (*Nanotech Albany, USA*)  
D. Vogel (*Fraunhofer IZM, MMCB, Berlin, Germany*)

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08:30 Sabaté, N.<sup>1</sup>, Vogel, D.<sup>2</sup>, Gollhardt, A.<sup>2</sup>, Keller, J.<sup>3</sup>, Marcos, J.<sup>1</sup>,  
Gràcia, I.<sup>1</sup>, Cané, C.<sup>1</sup>, Michel, B.<sup>2</sup>

*Key-note* <sup>1</sup> *Autonomous University of Barcelona, Spain*

<sup>2</sup> *Fraunhofer IZM, Micro Materials Center, Berlin*

<sup>3</sup> *AMIC GmbH, Berlin, Germany*

**Confined residual stress measurements on thin  
films deposited onto thick substrates with a FIB  
equipment**

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08:55 Lempidaki, D.E., Kubler, R.F., Busso, E.P., O'Dowd, N.P.,  
Nikbin, K.

*Imperial College, London, U.K.*

**Development of a photogrammetric technique to  
determine crack tip strain fields at elevated  
temperatures**

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09:15 Vermeulen, A.C., Fransen, M.

*PANalytical, Almelo, The Netherlands*

**A new method for determining the residual stresses  
in coatings**

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09:35 Altmann, F., Graff, A., Simon, M.

*Fraunhofer IWMH, Halle/S., Germany*

**Advanced focused ion beam techniques for process  
control of sub 100nm technologies**

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09:55 – 10.30 Coffee break

**Wednesday, Sept. 5, 8:30 – 9:55, Early Morning Session /7.4/,  
Crack and fracture**

Chairmen: M. Petzold (*Fraunhofer IWMH, Halle/S., Germany*)  
L. Doireau (*EDF R&D Fiabilité électronique / Electronic reliability,  
LME – CEMEAT, Moret sur Loing, France*)

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08:30                      Cambruzzi, A., Dual, J.  
*Key-note*                      *ETH Swiss Federal Institute of Technology Zürich,  
Switzerland*  
**Near threshold fatigue crack growth investigation on  
notched micro-resonator**

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08:55                      Alush, H., Katz, Y.  
*Negba Institute, Beer Sheva, Israel*  
**Fatigue crack initiation stage: Reflection on small  
volume segment applications**

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09:15                      Bagdahn, J.<sup>1</sup>, Allen, R.<sup>2</sup>, Marshall, J.<sup>2</sup>, Read, D.<sup>3</sup>, Baylies, W.A.<sup>4</sup>,  
Turner, K.<sup>5</sup>  
*<sup>1</sup> Fraunhofer IWMH, Halle/S., Germany*  
*<sup>2</sup> National Institute of Standards and Technology NIST,  
Gaithersburg*  
*<sup>3</sup> National Institute of Standards and Technology NIST,  
Boulder*  
*<sup>4</sup> BayTech Group, Weston*  
*<sup>5</sup> University of Wisconsin-Madison, Madison, USA*  
**Measurement of fracture toughness of wafer-bonded  
silicon using the new SEMI standard for micro-  
Chevron-samples**

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09:35                      Badri Ghavifekr, H.  
*Sahand University of Technology, Sahand New Town,  
Iran*  
**Estimation of crack propagation through  
mismatched interfaces due to thermally induced  
stress**

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09:55 – 10.30      Coffee break

**Wednesday, Sept. 5, 8:30 – 9:55, Early Morning Session /7.5/,  
Reliability monitoring & diagnostics**

Chairmen: E. Suhir (*University of California, Santa Cruz, USA*)  
J. Nuffer (*Fraunhofer LBF, Darmstadt, Germany*)

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08:30 Rouet, V.<sup>1</sup>, Delye, A.<sup>1</sup>, Vichare, N.<sup>2</sup>, Pecht, M.G.<sup>2</sup>, Foucher, B.<sup>1</sup>  
*Key-note* <sup>1</sup> *EADS Innovation Works, Suresnes, France*  
<sup>2</sup> *The University of Maryland, CALCE EPSC, College Park, USA*

**Embedded remaining life prognostics and diagnostics of electronics**

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08:55 Bochow-Ness, O., Fujino, M., Middendorf, A., Reichl, H.  
*Technical University of Berlin, Germany*  
**Condition indicators for microsystem monitoring of microsystems**

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09:15 Yu, X.-L., Lou, W.H., Ma, B.Z., Wang, Y.-Q.  
*Beijing Institute of Technology, China*  
**Based on microsystems distributed BIT diagnostic network for robot**

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09:35 Urbanski, K., Wymyslowski, A., Matkowski, P., Fałat, T.  
*Wroclaw University of Technology, Poland*  
**Application of an Ethernet microcontroller in a fast data acquisition system for long-term reliability tests of microelectronic interconnections**

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09:55 – 10.30 Coffee break

**Wednesday, Sept. 5, 8:30 – 9:55, Early Morning Session /7.6/,  
Reliability applications VI**

Chairmen: S. Sedmak (*University of Belgrade, Serbia*)  
H. Walter (*Fraunhofer IZM, MMCB Berlin, Germany*)

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08:30 Sedmak, S., Kirić, M., Sedmak, A.  
*Key-note, invited University of Belgrade, Serbia*  
**The reliability criteria and failure modes in fracture  
mechanics**

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08:55 Hertl, M., Weidmann, D., Lecomte, J.-C.  
*INSIDIX, Seyssins, France*  
**Reliability improvement by advanced failure  
assessment strategy**

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09:15 Middendorf, A.<sup>1</sup>, Griese, H.<sup>2</sup>, Nissen, N.F.<sup>2</sup>, Reichl, H.<sup>1, 2</sup>  
<sup>1</sup> *Technical University of Berlin*  
<sup>2</sup> *Fraunhofer IZM, Berlin, Germany*  
**The sustainability perspective of reliability for  
microelectronics**

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09:35 Zacharopoulos, D.A., Kalaitzidis, P.A., Gdoutos, E.E.  
*Democritus University of Thrace, Xanthi, Greece*  
**Theoretical and experimental study of failure of  
foam-core sandwich beam under three-point  
bending**

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09:55 – 10.30 Coffee break

**Wednesday, Sept. 5, 10:30 – 11:55, Late Morning Session /8.1/,  
Interdisciplinary reliability aspects**

Chairmen: S. Fiedler (*Fraunhofer IZM, Berlin, Germany*)  
N. Gitis (*CETR, Campbell, USA*)

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10:30 Wolf, M.J.<sup>1</sup>, Michel, B.<sup>2</sup>, Ramm, P.<sup>3</sup>, Reichl, H.<sup>1</sup>

*Key-note, invited*

<sup>1</sup> *Fraunhofer IZM, Berlin,*

<sup>2</sup> *Fraunhofer IZM, Micro Materials Center,  
Berlin and Chemnitz,*

<sup>3</sup> *Fraunhofer IZM, Munich, Germany*

**System integration on wafer level – Requirements  
and technical solutions**

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10:55 Bajpai, R.

*Invited*

*Rani Durgavati University, Jabalpur, India*

**Mechanical characterization of biocompatible  
materials**

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11:15 Bechmann, F.

*BMW Bayerische Motoren Werke AG, Munich, Germany*

**Microstructural materials modelling of particle  
reinforced light metals**

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11:35 Fiedler, S., Zwanzig, M., Schmidt, R., Scheel, W.

*Fraunhofer IZM, Berlin, Germany*

**Development and evaluation of microelectronic  
packaging concepts based on submicron wires**

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11:55 – 13.00 Lunch break

**Wednesday, Sept. 5, 10:30 – 11:55, Late Morning Session /8.2/,  
Thermal modelling & characterization**

Chairmen: R. Schacht (*University of Applied Sciences Lausitz, Senftenberg*)  
J.-P. Sommer (*Fraunhofer IZM, MMCC, Chemnitz, Germany*)

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10:30 Brunschwiler, T., Rothuizen, U. H., Kloter, U., Linderman, R.,  
Wälchli, R., Michel, B.

*Key-note* IBM Research GmbH, Zurich Research Laboratory,  
Rüschlikon, Switzerland

**Interlayer heat transfer for vertically integrated  
packages**

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10:55 Heino, P.

*Invited* Tampere University of Technology, Finland

**Simulations of nanoscale thermal conduction**

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11:15 May, D.<sup>1</sup>, Schacht, R.<sup>2,1</sup>, Wunderle, B.<sup>1</sup>, Kreyßig, K.<sup>3</sup>, Michel, B.<sup>1</sup>,  
Reichl, H.<sup>4,1</sup>

<sup>1</sup> Fraunhofer IZM, Berlin

<sup>2</sup> University of Applied Sciences Lausitz, Senftenberg,

<sup>3</sup> AMIC Angewandte Micro-Messtechnik GmbH, Berlin

<sup>4</sup> Technical University Berlin, Germany

**Advanced IR-thermography techniques for non-  
destructive testing of microelectronic components**

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11:35 – 13.00 Lunch break

**Wednesday, Sept. 5, 10:30 – 11:55, Late Morning Session /8.3/,  
Reliability and microstructure**

Chairmen: S.-W. Yu (*Tsinghua University, Beijing, China*)  
N. Sabaté (*CNM-CSIC, Bellaterra, Spain*)

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09:00 Goldstein, R.V., Shushpannikov, P.S., Ustinov, K.B.  
*Key-note, invited* *Institute for Problems in Mechanics of RAS, Moscow*  
**Modelling of formation of systems SiO<sub>2</sub> precipitate –  
dislocation loops in Silicon wafers**

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10:55 Müller, M., Wiese, S., Röllig, M., Wolter, K.-J.  
*Dresden University of Technology, Germany*  
**Influence of size, cooling rate and composition on  
the grain orientation of lead-free solder joints**

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11:15 Okolo, B., Rögner, J., Kerscher, E., Beck, T., Schulze, V.,  
Wanner, A., Löhe, D.  
*University of Karlsruhe, Germany*  
**Size effects in Aluminium bronze cast specimens**

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11:35 Corradi, U., Weippert, C., Villain, J.  
*University of Applied Sciences Augsburg, Germany*  
**EBSB measurements in small lead-free solder joints**

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11:55 – 13.00 Lunch break

**Wednesday, Sept. 5, 10:30 – 11:55, Late Morning Session /8.4/, Adhesion**

Chairmen: H. Miura (*Tohoku University, Sendai, Japan*)  
D.H. Alsem (*Lawrence Berkeley National Lab, Berkeley, USA*)

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10:30 Caers, J.F.J.M.<sup>1</sup>, Zhao, X.J.<sup>1</sup>, de Vries, J.W.C.<sup>1</sup>, Wong, E.H.<sup>2</sup>  
*Key-note* <sup>1</sup> Philips Applied Technologies, Eindhoven, The Netherlands  
<sup>2</sup> Institute of Microelectronics (IME), Singapore, Singapore  
**Highly accelerated reliability tests for conductive adhesive interconnects**

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10:55 Bahr, D.F., Kennedy, M. S., Yeager, J. D.  
*Washington State University, Pullman, USA*  
**Adhesion of noble metals for electrodes in MEMS**

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11:15 Jansen, K.M.B., Patel, M., Ernst, L.J., Bohm, C.  
*Delft University of Technology, The Netherlands*  
**Transient bulk modulus of a novolac epoxy resin**

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11:35 Ocana, I.<sup>1</sup>, Molina-Aldareguia, J.M.<sup>1</sup>, Gonzalez, D.<sup>1</sup>, Elizalde, M.R.<sup>1</sup>, Sanchez, J.M.<sup>1</sup>, Martinez-Esnaola, J.M.<sup>1</sup>, Gil-Sevillano, J.<sup>1</sup>, Pantuso, D.<sup>2</sup>, Sun, B.<sup>2</sup>, Xu, G.<sup>2</sup>, He, J.<sup>2</sup>, Maiz, J.<sup>2</sup>  
<sup>1</sup> CEIT and TECNUN, San Sebastian, Spain  
<sup>2</sup> Intel Corporation, Hillsboro, USA  
**Adhesion studies in integrated circuit interconnect structures**

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11:55 – 13.00 Lunch break



**Wednesday, Sept. 5, 10:30 – 11:55, Late Morning Session /8.6/,  
Reliability applications VII**

Chairmen: R. Kohl (*Conti Temic microelectronic, Nuremberg, Germany*)  
M. Omiya (*Keio Univesity, Yokohama, Japan*)

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10:30 Maire, O.<sup>1</sup>, Chaillot, A.<sup>1</sup>, Munier, C.<sup>1</sup>, Lombaert-Valot, I.<sup>1</sup>,  
Bousquet, S.<sup>2</sup>, Chastanet, C.<sup>2</sup>, Plouseau, D.<sup>3</sup>, Munier, E.<sup>3</sup>, Maron,  
D.<sup>4</sup>, Raynal, P.<sup>4</sup>, Villard, S.<sup>5</sup>, Dumonteil, R.<sup>5</sup>

*Key-note*

<sup>1</sup> *EADS CRC, Suresnes,*

<sup>2</sup> *AIRBUS France, Toulouse,*

<sup>3</sup> *EADS DCS, Elancourt,*

<sup>4</sup> *ACTIA, Toulouse,*

<sup>5</sup> *TECHCI, Saint-G nix sur Guiers, France*

**Reliability of components with Pb soldered in a lead-free process (Green electronics for aeronautical and military communication systems – GEAMCOS project)**

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10:55 Drumea, A., Vasile, A.

*Politehnica University Bucharest, Romania*

**Efficient and reliable communications in industrial control and mechatronic systems**

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11:15 K mpfe, A.

*Witzenmann GmbH, Pforzheim, Germany*

**Micro-size metal bellows as an example for miniaturisation and reliability of mechanical components**

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11:35 Klein, M.<sup>1</sup>, Oppermann, H.<sup>1</sup>, Hutter, M.<sup>1</sup>, Fritzscht, T.<sup>1</sup>, Engelmann,  
G.<sup>1</sup>, Dietrich, L.<sup>1</sup>, Wolf, M. J.<sup>1</sup>, Br mer, B.<sup>2</sup>, Dudek, R.<sup>2</sup>, Reichl, H.<sup>1</sup>

<sup>1</sup> *Fraunhofer IZM, Berlin*

<sup>2</sup> *Fraunhofer IZM, Chemnitz, Germany*

**Reliability investigation of large GaAs pixel detectors flip chip bonded on Si readout chips**

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11:55 – 13.00 Lunch break

## POSTERS

Posters are on display from Monday, Sept.2, 10:00, till Wednesday, 14:30.

Apart from the conference breaks, special time for discussion with the authors at the poster stands is on Tuesday, 15:45 – 16:15.

- 
- Poster 01* Bauer, M.<sup>1,2</sup>, Vieth, S.<sup>1,2</sup>, Uhlmann, M.<sup>2</sup>, Landeck, S.<sup>1</sup>  
<sup>1</sup> *Fraunhofer IZM, Teltow*  
<sup>2</sup> *BTU Cottbus, Cottbus, Germany*
- Promising filler for electric-packaging materials:  
 $\beta$ -eucryptite**
- 
- Poster 02* Bombach, C.<sup>1,2</sup>, Michel, B.<sup>1</sup>, Winkler, T.<sup>2</sup>, Keller, J.<sup>3</sup>,  
Kaulfersch, E.<sup>4</sup>, Seiler, B.<sup>4</sup>  
<sup>1</sup> *Fraunhofer IZM Berlin*  
<sup>2</sup> *Berliner Nanotest und Design GmbH*  
<sup>3</sup> *AMIC GmbH Berlin*  
<sup>4</sup> *Chemnitzer Werkstoffmechanik GmbH*
- Analysis of potential failure mechanisms in SOP  
microsystems**
- 
- Poster 03* Brämer, B.<sup>1</sup>, Dudek, R.<sup>1</sup>, Michel, B.<sup>1</sup>, Brückner, J.<sup>2</sup>, Krautheim, G.<sup>2</sup>  
<sup>1</sup> *Fraunhofer IZM, Micro Materials Center, Chemnitz,*  
<sup>2</sup> *Zwickau University of Applied Science, Zwickau,  
Germany*
- Wafer bow caused by intrinsic stress in ALD films**
- 
- Poster 04* Faust, W., Dudek, R., Poller, T., Michel, B.  
*Fraunhofer IZM, Micro Materials Center, Chemnitz,  
Germany*
- Microstructure of damaged solder**
- 
- Poster 05* Geissler, U.  
*CWE - Chemnitzer Wirtschaftsförderungs- und  
Entwicklungsgesellschaft mbH, Chemnitz, Germany*
- Smart Systems Campus - A new Technology Park in  
Chemnitz**
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<i>Poster 06</i>	<p>Gerdes, H., Gatzel, H.H.  <i>Leibniz University Hanover, Germany</i></p> <p><b>Focused ion beam core hole drilling for stress detection in thin films</b></p>
<hr/>	
<i>Poster 07</i>	<p>Gollhardt, A., Michel, B.  <i>Fraunhofer IZM, Micro Materials Center, Berlin, Germany</i></p> <p><b>Focused Ion Beam (FIB) as an analytical tool in micro- and nanotechnology</b></p>
<hr/>	
<i>Poster 08</i>	<p>Hecht, S., Hoffmann, M.  <i>Ilmenau University of Technology, Germany</i></p> <p><b>Reliability of “Black Silicon” for MEMS packaging</b></p>
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<i>Poster 09</i>	<p>Heimann, M. et al.  cancelled</p>
<hr/>	
<i>Poster 10</i>	<p>Heuer, H.<sup>1</sup>, Meyendorf, N.<sup>1</sup>, Oppermann, M.<sup>2</sup>, Wolter, K.-J.<sup>2</sup>  <sup>1</sup> <i>Fraunhofer IZFP, Dresden</i>  <sup>2</sup> <i>Dresden University of Technology, Dresden, Germany</i></p> <p><b>The Center for Non-destructive Nano Evaluation (<i>nanoEVA</i>), a new research facility in Dresden</b></p>
<hr/>	
<i>Poster 11</i>	<p>Kim, J.Y. et al.  cancelled</p>
<hr/>	
<i>Poster 13</i>	<p>Kosobutskyy, P.S.<sup>1</sup>, Kosobutskyy, Ya.P.<sup>1</sup>, Kushnir, O.P.<sup>2</sup>.  <sup>1</sup> <i>Lviv Polytechnic National University, Lviv</i>  <sup>2</sup> <i>Lviv State Agrarian University, Dubljany, Ukraine</i></p> <p><b>About a principle of the interferometric sensor creation</b></p>
<hr/>	
<i>Poster 14</i>	<p>Köhler, B., Bendjus, B.  <i>Fraunhofer IZFP, Dresden, Germany</i></p> <p><b>Test samples for micro- and nano- non-destructive evaluation</b></p>

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Poster 15 Krause, M., Graff, A. , Altmann, F.  
*Fraunhofer IWMH, Halle/S., Germany*

**Determination of residual stress in Silicon using electron backscatter diffraction**

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Poster 16 Kreyßig, K.<sup>4,5</sup>, Krahn, L.<sup>1</sup>, Auersperg, J.<sup>2,5</sup>, Zerna, T.<sup>3</sup>,  
Oppermann, M.<sup>3</sup>, Seiler, B.<sup>4</sup>, Keller, J.<sup>5</sup>, Ritzenhoff, S.<sup>6</sup>, Scholz,  
G.<sup>6</sup>, Mathiak, G.<sup>7</sup>, Schmidt, T.<sup>7</sup>, Magh, M.<sup>8</sup>

<sup>1</sup> *Fraunhofer IZM Paderborn*  
<sup>2</sup> *Fraunhofer IZM Berlin/Chemnitz, Micro Materials Center*  
<sup>3</sup> *TU Dresden, Zentrum für mikrotechnische Produktion*  
<sup>4</sup> *Chemnitzer Werkstoffmechanik GmbH*  
<sup>5</sup> *AMIC Berlin*  
<sup>6</sup> *Creos Lernideen und Beratungs GmbH, Bielefeld*  
<sup>7</sup> *ZAVT GmbH Lippstadt*  
<sup>8</sup> *Magh & Boppert Objektorientierte Softwareentwicklung Paderborn*

**BIZAM – Next generation consulting system for thermo-mechanical analyses in microelectronics and MEMS technologies**

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Poster 17 Lee, J., Cho, C.S., Morris, J.E.  
*Portland State University, USA*

**Electrical and reliability properties of isotropic conductive adhesives on immersion silver printed circuit boards**

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Poster 18 Loboda, O.S. et al.  
*cancelled*

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Poster 19 Luczak, F.<sup>1</sup>; Kämpfe, B. <sup>2</sup>, Urban, M. <sup>3</sup>

<sup>1</sup> *Technical University of Berlin*  
<sup>2</sup> *Chemnitzer Werkstoffmechanik GmbH*  
<sup>3</sup> *University of Applied Sciences (FHTW) Berlin, Germany*

**Evaluation of diffraction patterns in high energy X-ray analysis**

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Poster 20

May, D.<sup>1</sup>, Schacht, R.<sup>1,3</sup>, Wunderle, B.<sup>1</sup>, Michel, B.<sup>1</sup>, Reichl, H.<sup>2</sup>  
<sup>1</sup> Fraunhofer IZM, Micro Materials Center, Berlin,  
<sup>2</sup> Technische Universität Berlin, Forschungsschwerpunkt  
Technologien der Mikroperipherik, Berlin,  
<sup>3</sup> Fachhochschule Lausitz, Senftenberg, Germany

**Pulse and Lock-In Infrared Thermography -  
Possibilities for non-destructive reliability analysis  
of micro-electronic assemblies**

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**EUCEMAN – The European center for micro- and  
nanoreliability**

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Poster 22

Noack, E.<sup>1</sup>, Seiler, B.<sup>1</sup>, Sommer, J.-P.<sup>1,2</sup>, Dost, M.<sup>1</sup>, Michel, B.<sup>2</sup>  
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**Deformation measurement for reliability assessment  
of components with hidden dies**

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Poster 23

Olszewski, O.Z.<sup>1</sup>, O'Mahony, C.<sup>1</sup>, Duane, R.<sup>1</sup>, Hill, M.<sup>2</sup>  
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**The role of surface roughness in RF MEMS  
capacitive switches**

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Poster 24

Ortner, H., Osenberg, F.  
Hamamatsu Photonics Deutschland GmbH, Herrsching,  
Germany

**Failure localisation by optoelectronic techniques**

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Poster 25

Radojevic, V.<sup>1</sup>, Lamovec, J.<sup>2</sup>, Jovic, V.<sup>2</sup>, Trifunović, D.<sup>1</sup>,  
Aleksic, R.<sup>1</sup>  
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<sup>2</sup> IChTM-Department of Microelectronic Technologies  
and Single Crystals, Belgrade, Serbia

**Analysis of the micromechanical properties of  
electrodeposited Ni coatings on different substrates**

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Poster 32 Schnitzer, R.<sup>1</sup>, Rümmler, N.<sup>1</sup>, Dost, M.<sup>2</sup>, Michel, B.<sup>3</sup>, Hauck, T.<sup>4</sup>  
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**Experimental vibration analyses by laser vibrometer under vacuum conditions**

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Poster 33 Seiler, B.<sup>1</sup>, Noack, E.<sup>1</sup>, Sommer, J.-P.<sup>2</sup>, Dost, M.<sup>1</sup>, Michel, B.<sup>2</sup>  
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**Design support for advanced radar sensors**

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Poster 34 Shodja, H.M., Kamalzare, M.  
*Sharif University of Technology, Tehran, Iran*

**The elastic fields of two interacting nano-voids in fcc materials via the many body atomic scale FEM**

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Poster 35 Sklyar, R.  
*Lviv, Ukraine*

**The microfluidic sensors based on the CNT or organic FETs**

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Poster 36 Specht, H., Mehner, J., Otto-Adamczak, T., Cristiano, D., Winkler, T., Neugebauer, R., Geßner, T.  
*Chemnitz University of Technology, Germany*

**enversys – Towards a competence center for advanced engineering and verification techniques for heterogeneous systems**

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Poster 37 Takao, H.<sup>1,3</sup>, Hayama, K.<sup>2</sup>, Tanaka, N.<sup>1</sup>, Ohyama, H.<sup>2</sup>, Ishida, M.<sup>1,3</sup>  
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<sup>2</sup> *Kumamoto National College of Technolog*  
<sup>3</sup> *Japan Science & Technology Agency, JST-Crest, Japan*

**Radiation resistance of 'MOSFET-like MEMS microvalve' for highly reliable microfluidic integrated circuits**

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Wilkinson, A.J., Meaden, G., Dingley, D.J.  
*University of Oxford, U.K.*

**Mapping strain tensors at the nanoscale using  
electron back scatter diffraction**

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Wittler, O.  
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**TeSiMat - A test system for ensuring material  
reliability in micro- and nanoelectronics developed  
at Fraunhofer Micro Materials Center, IZM Berlin**

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Zschenderlein, U.<sup>1</sup>, Frühauf, J.<sup>1</sup>, Straube, H.<sup>1</sup>, Gärtner, E.<sup>2</sup>,  
Kämpfe, B.<sup>3</sup>, Luczak, F.<sup>3</sup>, Zimny, F.<sup>4</sup>, Petrick, H.<sup>4</sup>, Böhme, H.<sup>5</sup>

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<sup>4</sup> *Petrick GmbH, Bad Blankenburg*

<sup>5</sup> *FMP Holding GmbH, Freiberg, Germany*

**X-ray optics manufactured by microtechnology  
for ED XRD systems**

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