

IMAPS International Conference on *High Temperature Electronics Network* *(HiTEN 2009)*

September 13 - 16, 2009
St. Catherine's College Oxford
Oxford, United Kingdom



Conference Chairs:

Colin Johnston

Oxford Applied Technology – UK
colin.johnston@materials.ox.ac.uk

R. Wayne Johnson

Auburn University
johnsr7@auburn.edu

Organizing Committee:

Alison Crossley, University of Oxford (UK)
Andy Longford, Panda Europe IMAPS (UK)
F. Patrick McCluskey, CALCE (US)
Denis Flandre, UCL (B)
Bernd Michel, FHG-IZM (D)
Randy Normann, Perma Works (US)
Bernard Parmentier, Schlumberger (F)
Sascha Schwarze, Baker Hughes INTEQ (D)
Ovidiu Vermesan, SINTEF (N)
Matthias Werner, NMTC (D)
Wolfgang Wondrak, Daimler Chrysler (D)

Early Registration:

August 28, 2009

Room/Food Reservation Deadline:

September 4, 2009

PROGRAM OVERVIEW

Session 1: Capacitors and Connectors

Chair: Colin Johnston, Oxford Applied Technology - UK

Session 2A: Devices

Chairs: Thomas Krebs, CISSOID; Joe Henfling, Sandia National Laboratory

Session 2B: Devices continued

Chair: Rene Lerch, Fraunhofer IMS

Session 3: Packaging Materials

Chair: Wayne Johnson, Auburn University

Session 4: Sensors and MEMS

Chairs: Randy Normann, Perma Works;
Alison Crossley, University of Oxford

Session 5: Packaging

Chairs: Ovidiu Vermesan, SINTEF;
Shane Rose, Quartzdyne

Session 6: Power Electronics

Chairs: Sascha Schwarze, Baker Hughes INTEQ;
Steve Riches, GE Aviation

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International Microelectronics And Packaging Society
(IMAPS)

Bringing Together The Entire Microelectronics Supply Chain!™



HiTEN Conference Focus:

The objective of the HiTEN Conference is to have a unique forum that brings together researchers and practitioners in academia and industry from all over the world. All styles of practical high temperature electronics design and implementation approaches are encouraged, along with a variety of high temperature application areas. Today the main semiconductor focus of HiTEN is silicon and silicon on insulator (SOI). But HiTEN is not simply a semiconductor-focused network. HiTEN provides a conduit for the exchange and dissemination of information on all aspects of high temperature electronics. It is a global network with users, suppliers, developers and fundamental researchers dealing in all aspects of High Temperature Electronics.

THANK YOU TO OUR CORPORATE SPONSORS

Visit our Corporate Sponsors Booths
Monday, September 14th thru Wednesday, September 16th



THANK YOU

A SPECIAL *THANK YOU*

TO ALL OF THE MEMBERS OF THE ORGANIZING COMMITTEE,
SPEAKERS, SESSION CHAIRS AND CORPORATE SPONSORS/EXHIBITORS
WHO WILL MAKE HiTEN 2009 A GREAT SUCCESS!

HiTEN Speaker Information

Final Manuscripts for the HiTEN Proceedings CD-ROM are due July 24, 2009.

Send Your Final Manuscript Via E-Mail to jmorris@imaps.org, in PDF format only (PDF can be in color).

PowerPoint/Presentation file used during session: Speaker's responsibility to bring to session on USB and/or CD (recommended to have back-up on personal laptop, cd-rom, or memory stick). Laptops will be provided by IMAPS in each session room.

Selected Manuscripts from HiTEN will be considered for publishing in the *Journal of Microelectronics and Electronic Packaging*. Invitations will be made separately. Inquiries can be sent to jmep@imaps.org.

Speakers must register for this conference at the reduced speaker rates. Early registration deadline is August 28, 2009; and Room/Food reservation deadline is September 4, 2009. See registration form for detailed information.

Sunday, September 13

CHECK-IN: 2:00 PM (PORTERS LODGE)

DINNER: 7:00 PM – 8:00 PM

Monday, September 14

REGISTRATION: 7:00 AM – 5:30 PM

BREAKFAST: 8:00 AM – 8:50 AM

OPENING REMARKS: 8:50 AM – 9:00 AM

CONFERENCE CHAIRS

SESSION 1: CAPACITORS AND CONNECTORS

Chair: Colin Johnston, Oxford Applied Technology - UK

9:00 am – 1:00 pm

Architecture Analysis of High Performance Capacitors

Jeffery T. Stricker, Hiroyuki Kosai, Tyler W. Bixel, Seana A. McNeal, James D. Scofield, Jennifer DeCerbo, Biswajit Ray, US Air Force Research Laboratory

Robust BME Class-I Ceramic Capacitors for High Temperature Applications

Xilin Xu, Bill Buchanan, Paul Staubli, Philip Lessner, Abhijit Gurav, KEMET Electronics Corporation

Thermally Robust Polymer Dielectric Systems for Air Force Wide-Temperature Power Electronics Applications

Narayanan Venkat, Victor K. McNier, Zongwu Bai, Marlene D. Houtz, Thuy D. Dang, University of Dayton Research Institute; Jennifer N. DeCerbo, Jeffery T. Stricker, US Air Force Research Laboratory

BREAK: 10:30 AM – 11:00 AM

Fabrication and Characterization of High Temperature Film Capacitors

Keith D. Jamison, R. D. Wood, B. G. Zollars, P. Le, Nanohmics, Inc.

Novel Solid Tantalum Capacitor for Demanding Applications Up to 200°C

Radovan Faltus, Tomas Zednicek, AVX Czech Republic S.R.O.

Adapting Press-Fit Connection Technology for Electronic Modules in Harsh Environments

Andy Longford, Panda Europe; Joseph Lynch, Interplex Industries Inc., USA

High-Dielectric-Constant Capacitors for High-Temperature Power Inverters in Hybrid Electric Vehicles

U. Balachandran, B. Ma, M. Narayanan, Argonne National Laboratory

LUNCH: 1:00 PM – 2:00 PM

Delegates Arrival/Check-in

Delegates are to report to the Porters Lodge upon arrival. **Check-in is from 2.00 pm onwards on the day of arrival.** If you arrive before this time you can leave your luggage in the safe room at the lodge. The lodge will assign you a room and give you the keys.

The hall will be open at all meal times and delegates can just arrive and be seated. Lunch is served promptly at 1.00 pm and Dinner at 7.00 pm; they are both served meals. Breakfast is more informal, served buffet style from 8.00 am - 9.00 am.

Conference Location

ST. CATHERINE'S COLLEGE OXFORD
MANOR ROAD
OXFORD
OX1 3UJ
UNITED KINGDOM

SESSION 2A: DEVICES

Chairs: Thomas Krebs, CISSOID; Joe Henfling, Sandia National Laboratory
2:00 pm – 5:30 pm

Product Test Results of the HTADC12 12 Bit Analog to Digital Converter at 250°C
Thomas B. Romanko, Mark Larson, Honeywell International Inc.

Performance and Reliability of SiGe Devices and Circuits for High Temperature Applications
Dylan B. Thomas, John D. Cressler, Laleh Najafizadeh, Leora Peltz, Stan Phillips, Ted Wilcox, Georgia Institute of Technology; R. Wayne Johnson, Auburn University

Introduction of Texas Instruments High Temperature Semiconductors
Mont Taylor, Brad Little, Texas Instruments

BREAK: 3:30 PM – 4:00 PM

SOI Lateral PIN Diodes for Temperature and UV Sensing in Very Harsh Environments
Bertrand Rue, Olivier Bulteel, Denis Flandre, University Catholique de Louvain-la-Neuve; Michelly de Souza, A. Pavanello, FEI

Quartzdyne ASIC Developments
Shane Rose, Mark Watts, Quartzdyne

Operational and Performance Test Results of the Reconfigurable Processor for Data Acquisition (RPDA) at 250°C
Thomas B. Romanko, Mike Johnson, Honeywell International Inc.

DINNER: 7:00 PM – 8:00 PM

Tuesday, September 15

REGISTRATION: 7:00 AM – 5:30 PM

BREAKFAST: 8:00 AM – 8:50 AM

SESSION 2B: DEVICES CONTINUED

Chair: Rene Lerch, Fraunhofer IMS
9:00 am – 11:00 am

Development of the First Commercialised Integrated Circuit Process Operating in the Range of 300°C to 450°C
James A. McGonigal, David T. Clark, Robin F. Thompson, Raytheon Systems Limited

Evaluation of an SOI Operational Amplifier with High Temperature Packaging
Liang-Yu Chen, Richard L. Patterson, Ahmad Hammoud, Michael J. Krasowski, Joseph M. Flatico, Dennis E. Culley, OAI / NASA Glenn Research Center

Performance of a Diode-Based Bandgap Reference Circuit
Paul Moody, Marshall Soares, Monte Johnson, NOV/Intelliserv

BREAK: 10:30 AM – 11:00 AM

Development of an Integrated Power Controller Based on HT SOI and SiC
Joseph A. Henfling, Stan Atcitty, Frank Maldonado, Sandia National Laboratories; Trevor Thornton, ASU, Randy Normann, Perma Works

SESSION 3: PACKAGING MATERIALS

Chair: Wayne Johnson, Auburn University
11:30 am – 1:00 pm

Dielectric, Thermal and Structural Characterization of Fluorinated Parylene Films for High Temperature Power Device Surface Insulation

Mireille Bechara, S. Diahm, M. L. Locatelli, S. Zelmat, C. Tenailleau, Université Paul Sabatier

Investigation of Polyimide/Carbon Nanotube Nanocomposites for High Temperature Electronic Packaging Applications

Qing-Yuan Tang, Y. C. Chan, N. B. Wong, City University of Hong Kong

Nanoparticle Enhanced Solders for High Temperature Reliability

Omid Mokhtari, Roya Ashayer, Samjid H. Mannan, Michael P. Clode, Kings College of London

LUNCH: 1:00 PM – 2:00 PM

SESSION 4: SENSORS AND MEMS

Chairs: Randy Normann, Perma Works; Alison Crossley, University of Oxford
2:00 pm – 5:30 pm

HTNFET Junction Capacitance Measurements, Theoretical Model and Validation for Development of High-Temperature Wireless Sensor Networks

Jonathan Gagnon, François Gagnon, École de Technologie Supérieure

High Temperature SOI CMOS Ultra Low Power Circuits for MEMS Co-Integrated Interfaces

Bertrand Rue, Nicolas Andre, Benoit Olbrechts, Jean-Pierre Raskin, Denis Flandre, University Catholique de Louvain-la-Neuve

High-Temperature SOI CMOS Compatible MEMS Pressure Sensors

René Lerch, Robert Klieber, Norbert Kordas, Holger Kappert, Fraunhofer IMS

BREAK: 3:30 PM – 4:00 PM

Explosion Metrology: A Better Bang for Your Buck?

Greg D. Horler, David McGorman, Instrumentel Ltd.

A Non Volatile MEMS Switch for Harsh Environment Memory Applications

Vikram Joshi, Richard Knipe, Rob VanKampen, Damian Lacey, Toshi Nagata, Dennis Yost, Charles Smith, Cavendish Kinetics, Inc.

High Temperature SiC Wireless Telemetry Systems

John Fraley, Bryon Western, Roberto M. Schupbach, Alexander B. Lostetter, Brice McPherson, Jared Hornberger, Jie Yang, Arkansas Power Electronics International, Inc.

DINNER: 7:00 PM – 8:00 PM

Conference Proceedings

If you are unable to attend the Conference and would like a copy of the CD-ROM Proceedings, you may purchase a copy by using the registration form. Your copy will be mailed to you after the event.

The cost is £125 before August 28th; £175 after August 28th, * plus shipping and handling. Reserve your copy on-line at www.imaps.org/hiten.

Student Paper Competition sponsored by:



Wednesday, September 16

REGISTRATION: 7:00 AM – 6:00 PM

CONTINENTAL BREAKFAST: 8:00 AM – 8:50 AM

SESSION 5: PACKAGING

Chairs: Ovidiu Vermesan, SINTEF; Shane Rose, Quartzdyne
9:00 am – 1:00 pm

Nano-Mechanical Analysis of Pb-Free Solders for Reliability Optimisation in High Performance Microelectronics Systems

V.M.F. Marques, C. Johnston, P.S. Grant, University of Oxford

Development of High Temperature Electronics Packaging Technologies for Long Term Operation at 250°C

S. T. Riches, Kevin Cannon, GE Aviation Systems; Colin Johnston, Mica Sousa, Patrick Grant, Oxford University; Jim Gulliver, Sondex Wireline Ltd.; Mark Langley, Vibro-meter UK Ltd.; Robin Pittson, Simona Serban, Denley Baghurst, Gwent Electronics Materials; Mike Firmstone, Thermastrat

Packaging Technology for High Temperature Silicon-on-Insulator Electronics

R. Wayne Johnson, Ping Zheng, Phillip Henson, Auburn University

BREAK: 10:30 AM – 11:00 AM

Thermomechanical Reliability Evaluation of Direct Bonded Aluminum (DBA) as a Substrate for High-Temperature Electronics Packaging

Thomas G. Lei, Jesus N. Calata, Khai D. Ngo, Guo-Quan Lu, Virginia Tech

The Development and Application of 225°C Hybrid Microcircuit Technology

Robert Hunt, Chris Andrews, C-MAC MicroTechnology

Hermetic Micro-Packaging with Heat Sinks

Marie Evrard, Nathan Foster, Pacific Aerospace & Electronics, Member of SOURIAU Group

Plastic Packaging for High Temperature Applications

Tanja Braun, K.-F. Becker, J. Bauer, M. Koch, V. Bader, R. Aschenbrenner, H. Reichl, Fraunhofer IZM

LUNCH: 1:00 PM – 2:00 PM

SESSION 6: POWER ELECTRONICS

Chairs: Sascha Schwarze, Baker Hughes INTEQ; Steve Riches, GE Aviation
2:00 pm – 6:00 pm

250°C Voltage Compliant SOI MESFETs for High Power PWM Drive Circuits

Nicholas Summers, William Lepkowski, Seth Wilk, Trevor Thornton, Randy Normann, Joseph Henfling, Arizona State University

High Temperature DC-DC Buck Converters for Point-of-Load (POL) Applications

Pierre Delatte, V. Dessard, A. Saib, E. Boufous, N. Pequignot, G. Picún, CISSOID S.A.

High Temperature Power Electronics IGBT Modules for Electrical and Hybrid Vehicles

Reiner John, Infineon Technologies; Ovidiu Vermesan, SINTEF

BREAK: 3:30 PM – 4:00 PM

High Temperature Power Electronic Packaging for Oil Well Applications

Rolf Johannessen, Andreas Larsson, Frøydis Oldervoll, Truls Fallet, SINTEF Information and Communication Technology

High Temperature Nanoelectronics for Electrical and Hybrid Vehicles

Ovidiu Vermesan, SINTEF; Reiner John, Infineon Technologies

A High Temperature 2 Amps Power Driver for SMPS and Motor Drive Applications

Pierre Delatte, E. Boufous, V. Dessard, A. Saib, N. Pequignot, G. Picún, CISSOID S.A.

High-Power and High Temperature SiC Power Module Development

Gavin Mitchell, Edgar Cilio, John Garrett, Marcelo Schupbach, Alex Lostetter, Arkansas Power Electronics International

CLOSING REMARKS: 6:00 PM

Upcoming Events ...

Advanced Technology Workshop on RF and Microwave Packaging

The Crowne Plaza San Diego
San Diego, California - USA

September 22 - 24, 2009

www.imaps.org/rf

Advanced Technology Workshop and Tabletop Exhibition on Thermal Management

Dinah's Garden Hotel
Palo Alto, California - USA

October 5 - 8, 2009

www.imaps.org/thermal

Emerging Technology Workshop on Nano-Integrated Microsystems Packaging: Design, Materials, Processes and Applications

University of Arkansas
Fayetteville, Arkansas - USA

October 13 - 15, 2009

www.imaps.org/nano

42nd International Symposium on Microelectronics (IMAPS 2009)

McEnery Convention Center - San Jose
San Jose, California - USA

November 1 - 5, 2009

www.imaps2009.org

Mark Your Calendar...Events being planned for 2010!

Advanced Technology Workshop and Tabletop Exhibition on Printed Devices and Applications

February 2010

www.imaps.org/printed

Global Business Council (GBC) Spring Conference

Radisson Fort McDowell Resort and Casino
Scottsdale/Fountain Hills, Arizona - USA

March 7 - 8, 2010

www.imaps.org/gbc

Co-located with Device Packaging Conference and Exhibition

International Conference and Exhibition on Device Packaging

Radisson Fort McDowell Resort and Casino
Scottsdale/Fountain Hills, AZ - USA

March 8 - 11, 2010

www.imaps.org/devicepackaging

Co-located with the GBC Spring Conference

Advanced Technology Workshop on Alternative Energy: Fuel Cells / Solar

The Westin Providence Hotel
Providence, Rhode Island - USA

April 12 - 15, 2010

www.imaps.org/ae

IMAPS/ACerS 6th International Conference and Exhibition on Ceramic Interconnect and Ceramic Microsystems Technologies (CICMT 2010)

OVTA
Chiba, JAPAN

April 18 - 21, 2010

www.cicmt.org

Advanced Technology Workshop and Tabletop Exhibition on Automotive Microelectronics

Doubletree Hotel
Dearborn, Michigan - USA

April 27 - 29, 2010

www.imaps.org/automotive

43rd International Symposium on Microelectronics (IMAPS 2010)

Raleigh Convention Center
Raleigh, North Carolina - USA

October 31 - November 4, 2010

www.imaps2010.org

REGISTRATION FORM

REGISTER ON-LINE AT WWW.IMAPS.ORG/HITEN

HITEN 2009 CONFERENCE - SEPTEMBER 13 - 16, 2009

Dr. Mr. Ms.

Member ID# _____

First Name _____ M.I. _____ Last Name _____

Company/Affiliation _____ Job Position _____

Address _____

City _____ State _____ Zip _____ Country _____

Phone _____ Fax _____ E-mail _____

REGISTRATION FEES: EARLY REGISTRATION ENDS 8/28/09

**ALL attendees MUST select one Registration fee
AND one Food/Room rate.**

HITEN REGISTRATION FEES

(On or before 8/28) (After 8/28)

- | | | |
|---|--------------|--------------|
| <input type="checkbox"/> Delegates | \$415 (£250) | \$580 (£350) |
| <input type="checkbox"/> Speaker <input type="checkbox"/> Chair | \$330 (£200) | \$590 (£300) |
| <input type="checkbox"/> Student (Full-time) | \$210 (£125) | \$330 (£200) |
| <input type="checkbox"/> Retired Delegates | \$210 (£125) | \$330 (£200) |

All registration fees include access to technical sessions and one Proceedings on CD-ROM.

HITEN ROOM/FOOD RATES: DEADLINE: SEPTEMBER 4, 2009

- En-Suite Full Board And Food \$490 (£295)

3 Nights Full board with all meals/beverages included: "Sunday, Monday, Tuesday;" (Breakfast, Lunches, Dinners and am/pm Breaks). **All meals served in the Dining Hall.**

- En-Suite Full Board And Food \$595 (£360)

4 Nights Full board with all meals/beverages included: "Sunday, Monday, Tuesday, Wednesday;" (Breakfast, Lunches, Dinners and am/pm Breaks). **All meals served in the Dining Hall.**

- Day Rate - Food Only \$110 (£65)

3 Days of Lunches and am/pm Breaks only: "Monday, Tuesday, Wednesday;" (Breakfasts and Dinners are not included). **Breakfast and Dinner tickets can be purchased below. All meals served in the Dining Hall.**

HITEN ADDITIONAL PURCHASES

- Add'l Conference Proceedings \$210 (£125) \$290 (£175)

ADDITIONAL MEAL TICKETS (OPTIONAL): Only select these options if you checked "Day Rate" above.

- Monday Breakfast for Day-Rate Delegates**
(included in En-Suite) - **\$13 (£8.00) each.**
- Tuesday Breakfast for Day-Rate Delegates**
(included in En-Suite) - **\$13 (£8.00) each.**
- Wednesday Breakfast for Day-Rate Delegates**
(included in En-Suite) - **\$13 (£8.00) each.**
- Monday Dinner for Day-Rate Delegates**
(included in En-Suite) - **\$34 (£20.25) each.**
- Tuesday Dinner for Day-Rate Delegates**
(included in En-Suite) - **\$34 (£20.25) each.**
- Wednesday Dinner for Day-Rate Delegates**
(included in En-Suite) - **\$34 (£20.25) each.**

PAYMENT

HITEN09

Registration Fee: \$ _____

Room/Food Fee: \$ _____

Additional Purchases: \$ _____

Total Payment Due: \$ _____

Enclosed is a check payable in US Dollars to IMAPS

Charge my fees to:

Visa MasterCard Discover Amex Diners Club

Card # _____ Exp. _____

Signature _____

Card billing address, if different from above: (required)

For Wire Transfer information, call 202-548-4001.

Mail this form with payment to: IMAPS * 611 2nd Street, NE * Washington, DC 20002-4909. For credit card transactions, register on-line: www.imaps.org; or register by phone with your credit card by calling 202-548-4001; Fax: 202-548-6115. Additional information? E-mail: IMAPS@imaps.org, or visit our web site: <http://www.imaps.org>. Cancellations will be refunded (less a \$50 processing fee) only if written notice is postmarked on or before **Friday, September 4, 2009**. No refunds will be issued after that date.

IMAPS Registration
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Washington, DC 20002-4909

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